

A CRITICAL EXAMINATION OF METHODS
OF INDUSTRIAL REMUNERATION
WITH SPECIAL REFERENCE TO THE REQUIREMENTS
OF BRITISH INDUSTRY.

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"Incentives" is a word frequently on the lips and in the writings of men and women who discuss the difficult economic situation of Great Britain today. An economic crisis of the first magnitude is upon us; production must be increased; time, labour and materials are in too short supply to permit the installation of the new machines which could effect this increase in output; what about the human beings who operate the machines? Are they playing their part? Could they be persuaded to work harder? And so the question of incentives arises.

This is a much wider question than merely a matter of payment-by-results; non-financial as well as financial incentives must be considered, and the psychologist as well as the economist and engineer demands a hearing. It is, however, the purpose of this research to examine the part which methods of industrial remuneration might play in the nation's "battle for output". Consideration of non-financial incentives, sales commissions, bonuses for administrators and executives, and kindred matters, has been omitted not because they are unimportant, but in order to reduce the problem to manageable proportions. For the same reason profit-sharing and co-partnership have been dealt with somewhat cursorily; there is a field of research here

which merits detailed exploration.

There has been very little quantitative research done in Great Britain on incentives since the First World War apart from the work of H.M. Vernon, P. Sargent Florence, and such bodies as the Industrial Health Research Board and the National Institute of Industrial Psychology. As far as methods of wage payment are concerned, although there is a vast literature on American experience in this field, very little has been written on the problem from the British point of view. The Government has apparently realised the need of research here, for it has recently appointed⁽¹⁾ a Committee on Industrial Productivity under the Chairmanship of Sir Henry Tizard, Chairman of the Advisory Council on Scientific Policy and of the Defence Research Policy Committee. The terms of reference, as given by the Lord President of the Council (Mr. Herbert Morrison), are: "To advise the Lord President of the Council and the Chancellor of the Exchequer on the form and scale of research effort in the natural and social sciences which will best assist an early increase in industrial productivity and further to advise on the manner in which the results of such research can best be applied."

Research in industrial productivity is difficult for a number of reasons. In the first place, one is dealing

(1) December 1947.

with human beings as well as machines; with subjective as well as objective factors. There are great difficulties in the way of measuring output with any degree of accuracy for the purpose of comparing the productivity of different workers or groups of workers, employed under different conditions and paid by different methods. Working conditions, efficiency of machinery, flows of materials, and so on, vary so very widely from plant to plant that comparisons are difficult if not dangerous.

Even if it can be established that productivity has in fact increased, the problem of isolating the real cause of the increase remains. Managements are constantly striving to improve efficiency by various means - incentive schemes, joint consultation, improved supervision, welfare provisions, and the like - and it is virtually impossible to make any quantitative assessment of the comparative value of the various measures which have been adopted. In these days one can hardly ask managements to co-operate in controlled experiments which would isolate cause and effect, but which would also seriously retard production during the experimental period.

A further difficulty has been experienced in securing factual information, namely the natural reticence of the business man regarding the divulging of

information on costs, profits, and so on - information which, if made public, might damage his competitive position in an already difficult market situation.

For these, and other reasons, the following study is factual but not statistical, and, inevitably in a subject of this nature, it is to some extent opinionative. Thanks are due to the many employers' federations, trade unions, public officials, manufacturers, workers and private individuals, who have so readily given what information they could from their funds of knowledge of this most important and fascinating, but albeit difficult, problem.

What is less generally realized is that the situation is fundamentally different from that obtaining prior to 1939, when a considerable part of Britain's standard of living was dependent upon income from foreign investments made during the previous century. During the Industrial Revolution this country went ahead of the rest of the world, and by investing large amounts of capital overseas ensured for succeeding generations an income which they

INTRODUCTION: THE INDUSTRIAL CONDITION
 OF BRITAIN TODAY.

Although the mind of this generation seems to a large extent to have become inured to living through a succession of crises, national and international, political and economic, there must surely be few people today who do not realise that the present economic condition of Great Britain is parlous in the extreme. As the recent Government White Paper (Cmd. 7046) pointed out:-

"The central fact of 1947 is that we have not enough resources to do all that we want to do. We have barely enough to do all that we must do. Whether we reckon in man-power, coal, electricity, steel, or national production as a whole, the conclusion is unavoidable. To get all we want, production would have to be increased by at least 25 per cent....."(1)

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(1) H.M.S.O. "Economic Survey for 1947" Cmd. 7046.

were not required to earn by their own efforts. Thus, until the recent war this country was able to import more than a corresponding value of exports without getting into difficulties. That this factor was an important one for our standard of living is patent when it is realised that in 1939 our foreign investments amounted to about £4,000,000,000 and brought in over £200,000,000 each year. Another £150,000,000 came in as a result of various services - shipping, finance, insurance, etc. - which this country rendered to other nations, so that in all we had each year some £350,000,000 worth of goods in excess of what we produced. Our total imports in 1939 were of the order of £884,000,000, so that nearly half of our imports came to us as a result of the efforts of by-gone generations; we had to work to pay for only some 56% of our total imports.

During the war so many of these foreign investments were sold in order to pay for food and essential war supplies that by the end of hostilities our income from this source was reduced by approximately 50%. In addition, much of our merchant shipping was sunk, (18 million of our pre-war total of 22 million tons) so that income from this source decreased also. This loss of investment income needs emphasis, for it demonstrates conclusively that it is not sufficient merely to step production up to pre-war standards; we must do more than this to regain our former standard of living, to say nothing of raising it.

The gravity of the situation was demonstrated in August 1947, when the Government brought forward measures designed to reduce our foreign spending by £228 millions a year. Although this is a colossal sum, it is in fact less than half of the great gap which will in some way or other have to be bridged. Sir Stafford Cripps, addressing over 2,000 representatives of both sides of industry, has revealed (October 1947) that our current adverse balance is running at the rate of approximately £600 million a year, so that, if we are to achieve any measure of equilibrium, we still have to make up (despite the cut of £228 millions) about £372 millions a year, by increased exports. As the average level of exports at the time of Sir Stafford's speech was £93 millions a month, the required increase (£31 millions a month) is 33 per cent. This increase is merely to avoid, to use Sir Stafford's own words, "a collapse of our efforts", and will contribute nothing towards raising our standard of living.

It is, then, quite patent that the essential need of the hour, as far as industry is concerned, is an increase in production per man-hour (P.M.H. as it has come to be known). Add to the loss of invisible exports the fact that we have to make up for the capital goods which were not produced during the war, and effect

long-overdue repairs to run-down capital equipment; make up for damage to houses and productive equipment by enemy action, and repay to our creditor countries what we borrowed during the war, and it must be realised that the urgency of the need is beyond dispute.

Despite this need, it is well-known that in a number of key industries productivity per man-hour is considerably less than it was before the war, and it may be that this decline is even more general. The White Paper(1) reports that in the building industry output is "far below" pre-war, probably 20-25 per cent, whilst in 1946 "output of deep-mined coal was 259 tons per man compared with 308 tons in the peak pre-war year, 1937", a reduction of 16 per cent. A more recent estimate puts total coal output at 19.7% less per year than pre-war, with 7.8% or 61,000 less workers (717,000 as compared with 778,000). The estimated drop in output per man-year is 8.4% and in output per man-hour 7%, the difference being due mainly to shorter working-hours. Although general manufacturing industry has 3 $\frac{1}{2}$ % (239,000) more workers than the 6,815,000 which it employed before the war, and production per man-hour has gone up by 6%, production per man-year has fallen by 7%, largely owing to the shortened working week. (2) As regards the cotton industry, Sir George Schuster, speaking to the Blackburn Chamber of Commerce on October 30th., 1947, said:

(1) Ibid. (2) "Business" December 1947 Vol. LXXVII No. 12.

"....Two years after the issue of the Cotton Working Party's report, output per operative had dropped from 81 per cent to 74.8 per cent below the pre-war production per man-hour.. " This means that whereas in 1946, production per man-hour was one-fifth below pre-war, by the end of 1947 it was one-quarter below.

One of the largest textile firms in Scotland employs over a thousand more operatives than it would have needed for the same poundage of yarn in pre-war days, equivalent to a fall in output of some $12\frac{1}{2}$ per cent for each worker. This is not due to material shortages, but to high rates of absenteeism and labour turnover. One of the largest Scottish engineering firms reported a similar fall in output, due not so much to poor production per man-hour of the workers on the bench, but rather to heavy overheads and the large labour-force necessary for maintenance work on old machines suffering from war-time overwork. In the iron-founding industry falls in production per man-hour of 30 or 40 per cent are by no means uncommon, due largely to material shortages and the fact that during the war the industry was robbed of many of its best workers who are now reluctant to goback to their former "dirty" trade.

The words of the Government poster are by no means extravagant: "We're up against it! We WORK or WANT."

I N C E N T I V E S T O W O R K .

We have seen that the words of the Government poster are indeed a true expression of the present economic position of this country, and it is probable that few people would deny the validity of its claim. But this does not necessarily mean that its appeal will be effective; it is a debateable point whether such exhortations - logical as they may be - can really be expected to induce the worker on the bench, the clerk in the office, and the directors in the boardroom so to increase their efforts that output is substantially increased. The output of the individual worker seems to him to be so remote from, and so infinitesimal in comparison with, the fortunes of the nation as a whole, that the average man, whilst he may agree with the sentiments expressed, remains for all practical purposes unmoved.

Undoubtedly education of the general public to a sense of responsibility for the welfare of the community as a whole can do something towards a solution of the problem, but it can do nothing towards changing the fundamental nature of men and women, that nature which determines what their motives, desires, thoughts, actions and reactions will be. In the speech already referred to, Sir Stafford Cripps realised that the problem was much more fundamental than merely one of education; he said:-

"I wish that today our country could refresh its heart and mind with a deep draught of that Christian faith which has come down to us over two thousand years, and has over those centuries inspired the peoples of Europe to fresh efforts and new hopes. It is that spirit, and not our own material hopes and difficulties, that can be the most potent source of our inspiration, call it by what name you will - self-sacrifice, honour, love, or comradeship. It is the strongest power in our lives, and at this moment of deep difficulty in our history we need its supporting strength as never before."

Satisfaction in work. There is little doubt that the best work is done by

the man who finds a sense of purpose in his job, the man who works because he enjoys it, and derives pleasure and satisfaction from it, the man who labours for "the love of craft, the love of achievement, the feeling that "he is" contributing something of hand and brain that remains something personal and intimate after it has been created."

(William Morris)

As Tolstoy once said "Labour must be acknowledged not as a curse, but as the joyful business of life." But this was very much easier in the old days of craftsmanship than it is today, for whilst the craftsman who creates his own design, prepares his own raw materials, and sees his job through from start to finish, can without question find satisfaction for his creative impulses in his everyday work, it is very difficult for the factory hand working on a conveyor belt

to do the same. Ever since the Industrial Revolution, the number of real craftsmen employed in industry has been growing smaller, and the vast majority of workers today are employed on monotonous repetitive or routine jobs in which it is inevitably extremely difficult to find any real sense of purpose or fulfilment. A correspondent in the "Times" commented upon the broadcast statement of the Lord President of the Council (Mr. Herbert Morrison) that "most talk about incentives is bunk", and said "Some sections of the community have always worked for non-material reasons, i.e. because their work gives them some positive, immediate and continuous satisfaction. It is the lack of this satisfaction in the work of the coal-miner or crossing-sweeper that is the primary problem today....."(1)

Many attempts have been made by various means to increase the satisfaction to be derived from the mundane, common-place tasks of the majority of workers in our Stakhanovism. highly industrialised society. The Stakhanovite Movement of the Soviet Union, which stimulated Russian production ten years or so ago, is a case in point. Alexei Grigoryevich Stakhanov was a miner in the Donetz coalfield, who became highly efficient with the pneumatic drill, so that whereas the average output of a miner was about six tons per shift, Stakhanov cut between twenty-five and

(1) Mr. Nigel Balchin in the "Times" September 1947.

thirty tons daily. In 1935 the output of the Central Irma pit was lagging, and methods of stimulating an increase had to be sought. An enterprising official, Petroff by name, thought of using Stakhanov as an example, and on August 30th., with an appropriate audience, the crack miner was set to work with a team of labourers to fetch and carry for him. That day he cut 102 tons of coal, and Petroff sent the news far and wide by press and radio throughout the Soviet Union. The Stakhanov Movement was launched, and everyone was talking about it. Every mine sought for its own champion worker who might become its "Stakhanovite"; a competitive spirit was fostered; a sense of purpose - to equal or beat Stakhanov's record - was found, and consequently production was given a very powerful impetus indeed, so that the Central Irma pit increased its output by forty per cent. The Movement spread and was adapted to other industries - the motor industry, the shoe manufacturers, agriculture, all produced their own Stakhanovite champion, and before long it had the backing of Stalin and the Soviet Government. Stakhanov himself was publicly decorated by Stalin with the Order of Lenin, he was handsomely rewarded by the State and feted by an adoring populace. The movement was given great publicity by press, radio and cinema, and Stakhanovite meetings were held in thousands of factories

and collective farms. Although the fervour eventually declined there is no doubt that the productivity of the average Soviet worker was permanently and substantially increased. In 1942 the Engineering and Allied Trades Shop Steward National Council recommended that the system be introduced in Britain, and in December of that year trophies were presented in London for the biggest increases in production during Soviet Anniversary Production Week.

National-
isation.

It is often claimed as one of the great advantages of Nationalisation that it causes workers to feel that they are working directly for the community rather than for individual capitalists, and so makes them readier to work harder to increase production. Certainly during the war - and especially during the Dunkirk period - the patriotic stimulus of service for the common cause was a very powerful element in increasing the output of the tools of war. It is, however, doubtful whether in peace-time this sense of service to the community would be an altogether effective substitute for the more mundane incentive of a larger pay-packet. Even during the war, large wage increases had to be given, and workers had to be directed into essential jobs. Nor did employers entirely disregard the financial incentive, for the 100 per cent Excess Profits Tax imposed in 1940 had to be modified during the following year, so that 20 per cent was treated as a post-war credit. The conclusion that non-

financial incentives cannot entirely take the place of the stimulus of money rewards, is endorsed even in the experience of that country which has gone farthest along the road away from capitalism - the U.S.S.R. In the early days of the present regime, the dictum "From each according to his ability; to each according to his need" held sway, and it was said that even the eminent scientist Pavlov received less remuneration than the miner, because he required less food to keep him alive and fit for work. Nowadays however, payment-by-results is almost universal, and wages rise very steeply for the highly-skilled worker, who also receives privileges and preferences of a non-financial nature. On the other hand inefficiency or laziness incur the most severe penalties.

Hawthorne
Experi-
ments.

This is not to say, however, that non-financial incentives do not have their part to play. The investigations carried out by the Harvard School of Business Administration, and popularly known as the "Hawthorne Experiments" shewed that many factors other than the purely financial had an important bearing upon workers' output. These experiments were carried out between 1927 and 1932 in the Western Electric Company's large factory at Hawthorne, Chicago, and have been fully reported in a number of publications(1).

(1) Vide: "Personnel Journal" Feb. 1930; Mayo: "Human Problems of an Industrial Civilisation" (Chaps. 3-5); T.N. Whitehead: "The Industrial Worker" (Harvard Business Review July 1934) and "Social Relationships in the Factory" (The Human Factor No. v, 1935); Roethlisberger: "Management and Morale", & "Management & the Worker".

A small group of five skilled female operatives was selected, and set to work on their usual tasks, but in a separate test room. They were asked to co-operate in the experiments, the purposes of which were explained to them. They were asked to work normally, without trying to increase output, and they were kept on the same group piece-rate on which they had formerly worked, except that now, of course, the group was much smaller.

Surprising increases in output were recorded; in the second year output rose by 20%, and subsequently was maintained at a level of 40% above the original figure, for a period of three years. Once the girls realised that they were taking part in an experiment they took an added interest in their work, and did not need to be supervised. They were told to work as they felt, and this sense of freedom seemed to destroy the barrier of suspicion between them and the management. They felt that they had added status, no longer being merely factory workers, but collaborators in an important research project, who were consulted by the management, and allowed to develop their own initiative. Working as they did in a small group, the girls developed a strong community spirit, and took over their own supervision, working together as a team. All these and many other factors which the experiments revealed prove that non-financial stimuli do exist even in modern industry, and have

a most important part to play. As Professor Dewey has said: "There is nothing in industrial production which of necessity excludes creative activity." (1)

Non-financial Incentives. There is undoubtedly a great field for research in this problem of non-financial incentives, but it is more within the province of the industrial psychologist than the business administrator, and it is not proposed to do more than mention them here. To sum up: apart from the incentive of personal gain or loss, probably the most important influence upon a worker's output is his attitude to his work. In order to afford him intrinsic satisfaction, it must seem to him to be worth while, that is, he must find in it fulfilment and sense of purpose. In order that this may be so he must be able to see where his own contribution to output fits into the general scheme of things, and the work of Mr. R.B. Wolf in his American plant is relevant here. (2) Having been appointed manager of a paper pulp mill in New Hampshire, U.S.A., Wolf sought to step up production by replacing the existing time-rate system by one of piece-work, but to this the mill-owner objected, so other means of increasing and improving output had to be found. He developed the use of charts which shewed the workers both the quantity and the quality of their output, and this engendered a competitive spirit among the workers which resulted in both an improvement and an

(1) J. Dewey: "Human Nature and Conduct"

(2) Dickinson "American Trends in Industrial Incentives" (Occupational Psychology, Winter 1938)

enlargement of output. Every effort was made to enable the workers to understand the processes of production, and the factors which made for high quality. As a consequence the workers felt that they were an important part of the scheme of things, their sense of responsibility was enhanced, and their creative instincts satisfied.

Then again, production is improved if there is a spirit of co-operation both among the workers themselves, and between them and the management. The Hawthorne Experiments already mentioned proved this beyond any shadow of doubt, and it has been the practical experience of many employers consulted during the course of this survey. One Edinburgh firm in the biscuit trade attributes its excellent industrial relations to the fact that it has maintained its traditional nature of a "family business"; the workers have free access to the management, and the latter make a point of mixing with the workers not only on business, but also on social occasions. The worker is enabled to see his place in the organisation by means of talks given by members of one department to those employed in others, and record charts prominently displayed in the workshops shew the progress of both the shop as a whole and of the individual workers in it.

Finally there must be absolute justice in the relations between management and men; once a man has a sense of grievance he never gives of his best. Favouritism,

nepotism, an aggressive dictatorial attitude, these are the worst possible disincentives; it is the employer who can inspire the loyalty and confidence of his men who will achieve the best results.

THE POWER OF THE FINANCIAL INCENTIVE TODAY.

Although there is room for considerable difference of opinion regarding the relative importance of the various incentives, financial and non-financial, there is a very large body of opinion which considers the financial incentive to be supreme, at least in our modern, mass-production society. In this connection it is interesting to note an experiment made in the Rowntree Cocoa Works, and reported by the Labour Manager, Dr. C.H. Northcott.⁽¹⁾ Certain groups of girl workers, who had formerly been paid on a piece-work basis, were changed over to a flat time-rate based on the previous piece-work earnings, and such that no worker received less than she had done under the old system. Next the management analysed the process of manufacture to discover factors which could be reduced to measurable standards for the purpose of stimulating the interest of the workers in the attainment of (a) better quality and (b) increased output. Each day the girls were individually "rated" by these standards, and the results posted both in figures and as charts. Opportunity was given for the workers to discuss relevant matters, air their views and grievances, and make suggestions. Every effort was made to give the workers a complete understanding of the work in which they were engaged, so that their interest would be aroused and held.

(1) C.H. Northcott: "Personnel Management; its Scope and Practice".

The success of Mr. Wolf's experiments in the U.S.A. was not repeated in the Cocoa Works. Although there was a slight increase and improvement in output, the workers did not like the scheme, and particularly objected to the substitution of the time-rate system for piece-work, the rating of the workers, and the posting of the charts. They claimed that piece-work was fairer, in that earnings varied directly with effort, and they preferred it also on the grounds that, under piece-work, the worker could set his own pace within reasonable limits, whereas, under time-rate, supervision had to be more strict. Here, it will be noticed, the non-financial incentive of a sense of freedom, is coupled with the financial incentive afforded by the piece-work system.

It is beyond dispute that "the human donkey requires either a carrot in front or a stick behind to goad it into activity."⁽¹⁾ Take that somewhat hackneyed model of the professional economist - the 'primitive man' who is entirely dependent for his livelihood upon the goods and services which he himself produces. He must grow his own food - or starve; he must kill animals for their skins - or go naked; he must build his own house - or go without shelter; he must gather his own firewood - or stay cold. The incentive here is simple and direct; the harder he works, the more food he has to eat, the

(1) "The Economist" 29th. June, 1946.

warmer is his body, and the more comfortable his home. If he is lazy or incompetent, it is he and his family who suffer; The disincentive is equally simple and direct. There is a positive and effective incentive to greater effort to be derived from the knowledge that he himself and his family will benefit directly thereby. Equally truly there is a positive and effective deterrent to laziness and incompetence in the fact that they will be the direct cause of the discomfort and possible starvation of himself and his family.

Self-interest.

It is fashionable today to claim that human beings are not motivated by self-interest such as this, but there can be no doubt that, despite higher education and wider culture, self-interest is, to the ordinary man, his primary concern. It is certainly unfortunate that this is so, and selfishness is not to be commended, but it does not lessen the truth of the statement; the theological concept of "original sin", humiliating though it be is fundamentally sound. In view of this inescapable fact, it is useless for us to try to build an economic society based on the Marxist precept of "from each according to his ability, to each according to his need." "However much we approve of discarding the whip of economic pressure, it would be foolish to shut our eyes to the fact that, when society discards it, it discards the biggest single incentive to effort so far discovered.."(1)

This analysis must now be adapted to the conditions of our present-day highly industrialised society, far removed

(1) Nigel Balchin, in "Occupational Psychology" July 1947

from the 'primitive peasant' of our model. Here, the simple, direct connection between effort and reward, or idleness and loss, does not exist, and as a consequence the difficulty of maintaining efficient incentives is very greatly increased.

Specialisation.

In our modern exchange economy, each individual is to some extent a specialist, producing goods or performing services not for his own direct needs, but to exchange via the medium of money for the goods and services which other people supply and which he himself needs. Thus, the miner who cuts more coal does not directly increase his own domestic stock of coal and, if he paid on a time basis, may not receive any additional benefit at all. It is, therefore, quite feasible for a man to put forth extra effort and skill, and yet receive no extra reward. Indeed, where the time-rate system of payment is in operation - and it is still the commonest form of wage payment - this is the rule rather than the exception.

Social services.

On the other hand, the reverse may be true, for everyone receives goods and services from the various agencies of State and Municipal government, irrespective of how hard he works, or even of whether he works at all. These public services - education, parks, libraries, roads, clinics, pensions, family allowances, unemployment insurance, and so on - are a very

important part of our standard of living, and, being paid for as they are out of taxation, come to the individual irrespective of the amount of effort and skill which he puts into his work. It is a clearly defined tendency today for the scope of such social services to be increased - "social security" from the cradle to the grave is the declared aim of all political parties - and this inevitably means that the incentive to hard work tends to diminish.

Every extension of the field of social security reduces the effectiveness of both the "carrot" and the "stick". So also does the policy of "full employment", a further principle to which every political party is committed. With both full employment, and comprehensive social insurance, the worker knows that it is highly improbable that he will lose his job, and if he does he will not suffer unduly because his needs will be met by national insurance. The direct incentive which impelled the primitive peasant to work because if he did not he would starve, has partly disappeared in our modern society.

Taxation.

All these measures of social security and public service have to be paid for, of course, and the consequent high taxation still further reduces the power of the financial incentive. Moreover it has always been considered one of the canons of taxation

that it should be "progressive", i.e. the higher one's income, the higher the rate of tax one has to pay, and from the point of view of social justice there is no doubt that this is a sound principle. Unfortunately it would be difficult to devise a system more calculated to blunt the edge of the financial incentive for, the more a worker earns, the larger the proportion of the additional earnings which are taken in taxation. Add to this the present system of "pay-as-you-earn" whereby tax is deducted immediately wages are earned, and a more direct "disincentive" would be hard to find. Indirect taxation acts in precisely the opposite manner, for if this form of taxation is imposed, and as a consequence prices of the taxed goods rise, there is automatically an incentive to earn more in order to buy the goods at their enhanced prices.

Then too the reduction in income tax allowances, and the general rise in wage-levels, have brought into the tax-paying class multitudes of workers who never paid income-tax before. Existing income tax payers had suffered the gradual rise of the standard rate to the present 9/- in the pound, but these new tax payers have had to endure this high rate from the very beginning, and the shock of this experience has certainly been responsible for much resentment, absenteeism, and the lack of effort, "since the workers believed that if

they worked after Thursday they had to give up half of what they earned to the Government". (1) It has been suggested that "targets" for production should be determined, with bonuses payable for output in excess of this figure, and that these bonuses should be paid free of income-tax. (2) Doubtless this would be frowned upon by the Treasury, but at present we have the completely illogical position of a low rate of tax on low output, and a high rate of tax on high output, which, in view of the clamant need for increased production, does not make sense. The decision of the Chancellor in the April 1948 Budget to widen the band of income payable at reduced rates of tax does something to alleviate the position but does not remove the disincentive of continuing high direct taxation. The Old Testament prophet of 520 B.C. might have been writing of today when he said: "He that earneth wages, earneth wages to put into a bag with holes.....Ye looked for much, and lo it came to little, and when ye brought it home, I did blow it away." (3)

If this tendency to reduce the power of the financial incentive by heavy taxation and the extension of the social services is to be reversed, it will involve a fundamental change in social policy. If taxation is reduced in order to restore the power of

(1) C.A. Lidbury: "A National Wages Policy" p.35

(2) Ibid, p.38.

(3) Haggai, chapter 1, verses 6 and 9 (M.V.)

the money incentive and so increase the national product, it will have to be at the expense of a less egalitarian society. We have come to the point when we must make up our minds which is the more important - a larger national product, or a more equal division of a smaller total. Recently our national policy has been to reduce inequality of incomes by direct taxation, but the more successful this policy is, the less incentive there is to hard work, and the less unpleasant are the results of indolence.

Diminishing returns

A further influence upon the power of the financial incentive merits attention. No-one would deny that a rising standard of living is a good thing, but from the point of view of incentives it does mean that the attraction of additional earnings progressively declines; the economist's "law of diminishing marginal utility" applies to income just as much as to the consumption of goods. "There is a world of difference between saying 'He who does not work shall not eat' and 'He who does not work shall not have a radio or a refrigerator'. All experience suggests that beyond a certain quite early stage the promise of higher wages for higher effort brings diminishing returns". (1) Even if piece-rates are in operation, it is the experience of employers that workers set themselves a

(1) Nigel Balchin in "Occupational Psychology" July 1947.

certain wage, which they consider will give them a reasonable standard of living, and when that level of earnings has been reached they do not feel it worth their while to exert themselves further in order to earn more money. "The classical example of this attitude is the miner who was brought before a recent Minister of Mines as a persistent absentee. The minister said, 'They tell me you work four days a week; why is that?' The miner replied, 'Because I find I can't earn what I want in three!'" If we assume that a man works because he must, we shall often get this reply and it will be a fair and logical one."⁽¹⁾ After all, leisure is just as much a part of one's standard of living as ordinary goods and services such as food and housing; a man may quite rationally prefer a smaller pay-packet with time to enjoy it, to a larger one and less leisure. The demand for leisure, less responsibility, or less hard work is just as real as the demand for a loaf of bread or a packet of tea. It does not normally become effective however until the normal subsistence demands have been satisfied, and this normal standard of living varies with the social group to which the individual belongs. Where it is low, the point at which the demand for leisure becomes insistent is soon reached; where it is high, the tendency to slack off will not come so quickly. This

(1) Nigel Balchin (ibid).

fact has an important effect on the present output problem. Recent decades have seen rapid rises in the wages of the working classes, whose standard of living has always been somewhat low. Consequently, once subsistence demands have been satisfied, the demand for less hard work and more leisure becomes effective at a fairly early stage, and more pay for more work loses some of its attraction and incentive power. The so-called middle classes are in a different position; their standard of living has been comparatively high, but their salaries have not kept pace with rapidly rising prices and rates of taxation, and as a consequence they are willing to work harder in order to satisfy the conventional needs of their social group. The importance of this phenomenon from the point of view of wage-payment is obvious and in order to counteract the tendency towards diminishing marginal utility of earnings, some employers have experimented with systems of payment by results which give an increasingly large reward for each unit of production above a certain level. (1)

Shortages.

A further factor tending to reduce the power of the financial incentive is one which - one hopes - is merely a temporary phenomenon, viz. the general shortage of consumer goods. Workers argue "Why should I work hard to earn more money when I can't buy what I want with it?"

(1) Vide post: chapter ~~X~~II...

and there is undoubtedly force in the argument. Recently it was agreed that more consumer goods should go to the mining areas in order to encourage the miners to earn more money.

In Belgium this factor is given such importance that the Government has adopted a policy diametrically opposed to the British programme of "austerity". "The British slogan is 'Export or die'; the Belgian is 'Fill the shops and we will fill the ships.' By filling the shops a tremendous spur has been given to production. Because there are goods to buy, people work and strive to make money. The shops, the restaurants, provide visible and obvious incentives..... (the) will to work is fortified by well-filled stomachs and by the abundance of goods that can be bought without coupons". (1) Which policy is right - the British or the Belgian - only history can decide.

Restrictionism.

Finally, consideration must be given to a factor, which, unfortunately, cannot be regarded as temporary, viz. the restrictionist attitude of mind which in recent decades seems to have developed in both organised labour and organised capital. The trade unions grew up against a background of surplus labour and unscrupulous exploitation, and consequently their whole policy was directed towards the protection of their members.

Restrictive practices which effectively prevented any

(1) Paul Bareau, in the "News Chronicle" 11th. Sept. 1947.

great increase in output were introduced, and in many cases still remain to this day - the fixation of maximum rates of working for individual jobs; opposition to payment-by-results, and preference for the simple time-rate system; hostility to mechanisation; go-slow tactics; guaranteed weeks; protection of lazy or incompetent workers against dismissal - such practices as these are inconsistent with conditions of full employment, shortage of labour, and clamant need for increased production in order to secure the economic survival of the nations.

Nor is organised capital exempt from this criticism. Recent decades have seen the rapid development of the trade association movement, designed to eliminate "destructive competition" - the only effective spur to efficiency known to a free society. "Self-government for industry" means the protection of the inefficient, high-cost producer, and the discouragement of the enterprising manufacturer anxious to reduce costs and prices and expand his market.

"The whole process of removing both the carrot and the stick has culminated in the extraordinary circumstances of today....Nobody gains anything from activity or suffers anything from inactivity. There is hardly a flavour of carrot or a shadow of the stick. And yet we wonder why the donkey does not break into a trot."(1)

(1) The "Economist" 29th. June 1946.

C H A P T E R I V .

WAGES: SOME PRELIMINARY CONSIDERATIONS.

If, as has been argued above, the financial incentive, with all its limitations, is still the dominant motivating force in industry today, the desirability of discovering the most satisfactory system of wage payment for each individual set of circumstances can hardly be over-emphasised. In the search for the ideal, it is necessary to bear in mind the attitude of both employer and employee, for if the wage-system is not acceptable to both it will fail in its purpose, however good its theoretical basis may be. The worker will judge any system of wage payment by at least two criteria, viz. (a) whether it is a fair return for the efforts that he makes on behalf of his employer, and (b) how it compares with the remuneration gained by workers performing similar functions in other undertakings. The essentials of a good incentive plan will be discussed in a subsequent section dealing with payment-by-results; here it may be said that the wage system must serve to promote confidence, understanding and goodwill between management and men. The design and working of the system should be made clear to the workers before its introduction, in order to avoid misunderstanding and ill-feelings later on.

Wage
Criteria.

The employer will judge the system as to whether or not it induces the worker to produce the largest possible output, consistent with the desired standards of quality, and the most economical use of materials. If the wage system results in increased efficiency, and consequently increased productivity, overhead charges per unit of output will be reduced. A very large proportion of the total costs of every industrial undertaking consists of fixed charges, costs which do not vary directly with output, e.g. lighting and heating charges, repairs, depreciation, expenses of administration and maintenance, and so on. If oncost per unit of product declines as output expands, and direct costs (e.g. materials, direct labour, etc.) per unit remain constant, then clearly total costs per unit of product will fall. Herein lies the great advantage of a system of wage payment which encourages workers to increase their output.

Again, a good wage system will result in less wastage of time and materials, and decreased costs of supervision. If it is directly in the interests of the worker to work steadily and efficiently, he will to some extent be his own supervisor. Not only will this reduce the costs of supervision, but it may also improve employee relations by removing the sense of grievance which is so frequently induced by the constant pressure upon the worker of his supervisors. If this is so,

and improved industrial relations result, not only does the employer gain from enhanced efficiency, but also from the reduction in labour turnover. A constantly fluctuating staff is a recurrent source of trouble and expense for training and equipment, and has a bad effect upon the firm's reputation in the labour market.

Thus, the importance of a good system of wage payment is beyond dispute, and in the following pages an attempt will be made to deal with those systems which are commonly found in, or which might profitably be adapted to, British industrial practice. The ground to be covered may be mapped out thus:-

1. The time-rate system.
2. Payment-by-results, i.e. remuneration based on output:
 - (1) Individual output:
 - (a) Piecework.
 - (b) Bonus systems.
 - (c) "Points" systems.
 - (2) Collective output: Group incentives.
3. Merit-rating schemes.
4. Profit-sharing and Co-partnership schemes.

It is very easy for employers to think that production is directly proportional to time worked, but experience during both the World Wars showed that as a general rule, overtime is an uneconomic proposition, one to be avoided so far as possible. In the first place, workers may be

(1) The Minister of Labour, 23rd November, 1947.

THE TIME-RATE SYSTEM.

This is the simplest and commonest form of wage payment in Great Britain, although nowadays the number of workers paid on time-rate is decreasing relative to those paid in other ways. According to a recent Government estimate⁽¹⁾ 70% of British manual workers in manufacturing industries were paid on a time basis, that is to say, they gave their services to their employers for an agreed sum of money per hour, per day, per shift, per week, or per annum. If the time unit is a day or a week, the number of hours to be worked during that period will be fixed, and any time worked in excess of that number of hours will count as overtime, and be paid for at an enhanced rate, as will also night duty and Sunday duty. The extra payment for overtime is usually expressed as a fraction of the normal rate, e.g. time and a quarter, time and a half, double time, and so on. The rate may be progressive according to the duration of the over-time, say time and a quarter for the first two hours, time and a half for the next two, and so on.

Overtime.

It is very easy for employers to think that production is directly proportional to time worked, but experience during both the World Wars showed that as a general rule, overtime is an uneconomic proposition, one to be avoided as far as possible. In the first place, workers may be

(1) The Minister of Labour, 25th. November, 1947.

tempted to "go slow" during the normal working hours, in order to necessitate the working of overtime, which will be paid for at the enhanced rates. This difficulty becomes increasingly acute as the working day is shortened both by legislation and by trade union agreement. The employer must take steps to keep up output by increasing the efficiency of his supervision, or else he must change over to payment by results in some form or other.

Maintaining For example, one large firm in the light metal trade
Output with
Time-wages makes it a matter of policy not to have piecework in any form, and is, therefore, restricted to using the time-rate system. During the war this rule was relaxed and a production bonus instituted, but the original policy was reverted to when the war was over. To maintain and increase productive efficiency under these circumstances was a difficult problem, and the factory manager, who was a man of considerable experience and initiative, commenced a training scheme for members of the supervisory staff, with the object of increasing their efficiency. He coached them, partly in the firm's time, in management subjects, so that the floor management and supervision were better equipped for their tasks, and the training was taken down to chargehand level by means of a T.W.I. ("training within industry") scheme. In addition the supervisors come on duty in their departments at least a quarter of an hour

before the shift, and they personally hand out the cards to employees with a "Good morning" as they clock in. The time clocks are locked two minutes after the starting bell, and any latecomers have to see their supervisors before starting work. These measures have been quite successful, and the firm claims that its post-war production is at least equal to anything that was achieved before the war, and in many cases it is better.

Quite apart from any question of deliberate idling, however, overtime output is usually uneconomic owing to the fact that a worker's reserve of strength is strictly limited. After Dunkirk, the supply position was so acute that extremely long working hours were instituted,, but it was soon found that a greater output could be achieved by cutting down this excessive working time, which only resulted in undue fatigue.

Lack of
Incentive.

The great defect of the time-rate system is that the same rate may be paid to workers who show wide variations in ability, energy, initiative, and output. A worker's earnings bear no direct relation to his individual output, although probably the time-rate has been calculated with reference to the average output of large numbers of workers, and the employer no doubt expects a certain amount of work to be forthcoming; if it is not, the worker may be dismissed. When this minimum expectation of work is rigidly fixed, and the worker is set a definite output

per working period, time-work becomes "task-work". If the man fails to reach the task he may be dismissed, or have a proportionate deduction made from his wages. This system is strongly opposed by the trade unions, and does not exist in any of the organised trades. F.W. Taylor's "differential piece-work system" shews some likeness to this idea of "task-work" in that the slow worker, who receives the lower rate, is very heavily penalised. It is more generous than the "task-work" system, however, in that the good worker does at least get a bonus.

The fact that all workers in the same grade receive the same wage means that there is no financial incentive to increase output, and the good worker feels that it is not worth his while to put forth extra effort when his less conscientious colleagues receive the same pay for doing less work. If the time-rate system is an incentive at all, it "is an incentive to mediocrity - an incentive to attain mediocrity, but because of the deep-seated human yearning for a 'fair deal', also an incentive not to exceed it." (1) Consequently the amount of output depends either upon the goodwill and conscientious attitude of the workers, or upon the effectiveness of the supervision and the fear of dismissal. In conditions of full employment, such as exist in the present immediate post-war period, the latter stimulus loses a good deal of its power, and

(1) E.D. Smith, in "Handbook of Business Administration" p. 1159.

there are widespread complaints among employers of a lack of discipline and will to work. Since full employment is the declared policy of all shades of political opinion, this problem is not merely one for the transition from war to peace.

The time-rate system is that which appears most commonly in collective agreements between employers and the trade unions, since it lends itself to application to large classes of workers as a minimum agreed rate. Traditionally, the trade unions have favoured uniformity for the same occupation and locality, and have frowned upon wide individual differences, due to their desire to maintain union solidarity and a collective spirit. It is much more difficult to negotiate standard piece-rates than standard time-rates, owing to the wide diversity of conditions, methods, materials and equipment to be found in the various factories concerned. For these reasons the time rate has become the basis of collective bargaining in the majority of the highly unionised trades. A less logical reason for trade union support for the time rate system is the fear that if piece-work is introduced and output is thereby increased, this will result in increased unemployment. However sound the economists' "long-run" arguments to the contrary may be, they fail to convince the average working man or his union leader.

Advantages
of Time-work.

Despite the fundamental defect of lack of incentive, the time-rate system offers the considerable advantage of simplicity. Wages calculations are a simple matter of multiplication, on the basis of the workers' time-cards. No complicated and difficult piece-work pricing is required, and the worker has a known and easily calculable wage, which is more stable than he would obtain under any system of payment-by-results.

In certain circumstances the time-rate is the only satisfactory method of wage payment, as where the amount of a worker's output is to a large extent outside his own control. The engine-driver, the box-office or lift attendant, the school-teacher - these obviously cannot be paid by results. Then again, the worker employed on a conveyon-belt or assembly line has only indirect control over the amount of his output; his rate of working is determined by the speed of the conveyor or automatic machine. It matters little in such cases whether the time rate or the piece-work system is in operation, for it virtually amounts to the same thing.

In the Ford plant at Dagenham the plain time-rate system is employed. Workers are divided into five groups - tradesmen, production workers, general workers (groups A and B) and women. There are probationary hiring rates, and automatic increases after three months' service, but no payment-by-results. The element of incentive is

introduced by offering to the good worker facilities for training for a higher-rated group, and by a system of "merit pennies" by which pennies are added to the hourly rate by departmental heads for efficient work and long service. So many of the Ford employees have their speed of working determined by conveyors or machines that the time-rate system is adequate for these mass-production conditions. It has been suggested in connection with the Ford plants in America that "he (Henry Ford) may also be influenced by the desire to devise and install labour-saving equipment without having to worry about the adjustment of piece-rates, or the question as to how the resultant labour savings should be shared." (1)

Quality.

Where quality is far more important than quantity, the time-rate system may result in less spoilt work. Payment-by-results may be so efficient an incentive to increased output that, in their haste and anxiety to earn bonus, workers may produce shoddy work which causes loss rather than gain to the employer. This danger can be averted by more efficient methods of quality control, however, and a number of firms engaged in precision work report no difficulty in connection with the maintenance of their standards of quality when systems of payment-by-results are employed..

One of the most successful methods of maintaining

(1) Balderston, Karabasz & Brecht: "Management of an Enterprise" p. 205.

output both quantitatively and qualitatively when hourly rates operate is the development of individual records of efficiency, which are used as the basis for promotion and wage increases. In this way efficiency is indirectly connected with earnings, and an approximation to payment-by-results is achieved. A Scottish firm in the bakery trade computes the efficiency of each operative on the basis of the number of units produced, and posts these efficiency coefficients periodically on the works notice-board. It is, however, found that the workers respond less satisfactorily now to this non-financial incentive than they did before the war, when jobs in other undertakings were less easy to find.

This adjustment of the time-rate in accordance with a worker's efficiency would seem to be a way out of the impasse connected with the lack of a financial incentive to increase output. Since the more efficient or energetic worker is worth more to his employer, there is, *prima facie*, no reason why he should not be paid more, although in some cases trade union opposition would prevent this. In the engineering industry, for example, there are "ability" or "lieu" rates, and workers on difficult jobs or working complicated machines may receive "differentials" of varying amounts. Many firms have found, however, that once a worker has been given such an enhanced rate, he tends to claim it as of right

for all time, and resents any reduction even if his efficiency subsequently declines. This resentment may be avoided only by the development of a systematic scheme of merit-rating, with the adoption of clearly defined standards, and this will be discussed fully in a later chapter.

Clerical and
Other staffs.

It is usual for clerical, technical, executive and administrative staff to be remunerated on a time basis, almost invariably an annual rate or salary. It is very difficult to evolve any systematic method whereby payment to such staff is in accordance with output; consequently a flat rate is paid, the amount being dependent on the nature of the business and the work performed, the responsibility of the post, the qualifications and training required, and the salaries paid for similar posts in other businesses. As far as possible the employer will try to pay his salaried employees according to their value to the company.

Where a fairly large number of clerical workers is employed, it may be possible to standardise and grade the posts for salary and promotion purposes. For example, the clerical posts on the main line railways are all placed into one of six classes: "special", first, second, third, fourth and fifth, depending on the responsibilities of the post, the amount of experience and training required, the position in the

organisation chart, the number of men supervised, and so on. The junior clerk starts in the lowest class - the fifth - in which he receives regular annual salary increments until he reaches the maximum. No further salary increases are given unless he is promoted, usually to a class 4 post, in which there will again be a minimum, maximum, and intermediate increments.

Promotion continues through the grades, each promotion involving transfer to a higher-graded post, until the more fortunate member of the staff reaches the "special" class. These posts are those where the work done is valued not by the time the employee puts in at his job, but by what he actually contributes towards the progress of the firm; posts in which the occupant is required to exercise independent and critical judgment, make major decisions, control large numbers of staff, and so on. In these ranges, salary is determined more by the worth of the individual to the company than by the requirements of the post.

Summary.

There is no doubt that the time-rate system offers the very substantial advantage of simplicity, and places a salutary emphasis upon quality of workmanship, which payment-by-results tends to ignore. It suffers from the fundamental defect, however, of the complete lack of financial incentive to increase output, a lack which would seem to be fatal in these days of stringent need

for production, and on the other hand steady decline in that moral calibre which prompted the craftsman of a by-gone day to work conscientiously irrespective of the stimulus of increased remuneration. Two ways out of the impasse seem to exist, viz. (a) payment-by-results in its various forms, and (b) daywork with some system of merit-rating, and both of these methods are discussed at some length below.

Sliding-Scales: Before leaving the time-rate system, however,

(a) Cost of Living.

mention must be made of a refinement which has sometimes been introduced, namely the adjustment of wages by sliding-scale arrangements. In a large number of industries there exist collective agreements whereby wage-rates are periodically adjusted on an agreed basis in accordance with changes in the official Cost-of-Living Index. The purpose of such arrangements is to relate wages to changes in the cost of living so as to maintain the level of real wages in times of rising prices. The method grew up out of the period of rising prices during and after the 1914-18 War, and became popular during the immediate post-war years. After 1922, however, its popularity declined and the number of workers covered by such arrangements fell from three millions to a million and a half in 1939. During the Second World War some schemes were abandoned, notably those in the railway industry, but many other trades took up

the method (coal-mining, iron and steel, cotton, tobacco, etc.) and it was estimated that in 1944 two and half million workers⁽¹⁾ were covered by arrangements of this kind. The range of industries includes mining and quarrying, pottery, iron and steel, textiles, clothing, tobacco, woodworking, building, and so on, and in some cases cost-of-living sliding scale arrangements are included in orders issued under the Wages Councils Act, 1945.

Tobacco.

The details of the schemes vary widely both in method and in complexity. A fairly simple arrangement operates in the tobacco trade;⁽²⁾ no addition to base-rates is made if the cost of living figure is 65 or less, but if it is more than 65 but not more than 114, the following additions to baserates are made for each unit by which the cost-of-living figure exceeds 65; male workers 21 years of age and over 4½d. per week; male workers under 21, 3d. per week; female workers, 3d. per week. For example, if the cost-of-living index stood at 99, the additional amount for an adult male would be 4½d. x 34 = 12/9d. per week. If the index rises above 114, the following additions are payable: adult males, 18/9d. per week; males under 21, 12/6d. per week; females, 12/6d. per week.

Coal.

In 1940 the cost-of-living sliding scale arrangement was introduced into the coal-mining industry.⁽³⁾

(1) "Ministry of Labour Gazette" June 1944.

(2) Notice N. (26) issued by the Tobacco Trade Board (Great Britain) 1943 and 1946. H.M. S. O.

(3)/

A uniform flat-rate addition per shift is paid, subject to quarterly review on the basis of changes in the cost-of-living index. The amount of the addition is ascertained each quarter by multiplying by 0.7d. the number of points by which the index number for the previous month exceeds 55 (the index for 1st. September, 1939). No alteration is made, however, unless and until the index shews a variation of five points or more from the number on which the last alteration was based. Thus, if the index stood at 100, the addition would be $0.7d. \times 45 = 2/8d.$ per shift. No alteration would be made to this figure unless the index number dropped to 95 or rose to 105.

Cotton.

In both spinning and manufacturing sections of the cotton industry, sliding scale arrangements operate. In the latter section of the industry, there is an agreement⁽¹⁾ which provides that the rates of wages operative in September 1939 shall be regarded as the base-rates, corresponding to a cost-of-living figure of 65 points, and that for each four points variation in the cost-of-living index these base-rates shall be raised or lowered by $2\frac{1}{2}$ per cent. the review to take place quarterly.

/(3) By agreement of 20th. March, 1940 between the Mining Association of Great Britain and the Mineworkers' Federation of Great Britain.

(1) Between the Cotton Spinners and Manufacturers' Association, and the Northern Counties Textile Trades Federation, 16th. January, 1940.

Criticisms
of the Index.

The official Cost-of-Living Index upon which these and other sliding-scale wage schemes have been based has been the subject of much justifiable criticism. It was first introduced during the First World War and was designed to measure the monthly increase in the cost of maintaining unchanged the standard of living of the average working-class household in July 1914. The index was based upon an enquiry into some 2,000 working-class budgets made by the Board of Trade in 1904, and it took account of changes in the retail prices of a wide selection of the (then) principal items of working-class expenditure, including food, rent, clothing, fuel and light, soap and soda, domestic ironmongery, brushes and pottery, kitchen hardware, tobacco and cigarettes, fares and newspapers. The items were weighted according to their relative importance in the working-class budget of that day.

New Index.

An index which reflected the living habits of nearly half-a-century ago is obviously an unsatisfactory basis for wage-payment; the working-class standard of living, ^{and} ~~for~~ the way in which people spend their income have changed enormously in the intervening years. In 1937-8, therefore, the Ministry of Labour investigated for a full year the household expenditure of some 9,000 working-class families, and it was found that a much smaller proportion of income was being spent on food, leaving more for "other items". The intervention of the War precluded any steps being taken as a result of this investigation, but in 1946 a

Committee⁽¹⁾ was set up and it issued its interim report in March 1947. This recommended the adoption of an Interim Index of Retail Prices to replace the old Cost-of-Living Index. The recommendation was followed and the 1914 index officially passed out of existence on 17th. June, 1947, the base-date chosen for the new Interim Index. How obsolete the old index had become is demonstrated by the changes in the new one; instead of only fourteen food items, 47 are now included; instead of a very few "other items", the new index includes expenditure on the cinema, football matches, radio sets, vacuum cleaners, and so on. These "other items" which were only weighted at 4 per cent in the old index, are now weighted at 16 per cent with an additional 24 per cent for items not included at all in the 1914 index. Another outstanding change is that the weighting for food has been reduced from 60 per cent to 35 per cent.

Thus, the new index will reflect much more accurately than did the old one, how people spend their income today, and, if it is incorporated in revised sliding-scale agreements, these will therefore be so much the more satisfactory. It is doubtful, however, whether this method of deliberately and directly linking wages to prices is desirable, especially in the present economic context.

(1) Committee set up by the Minister of Labour, under the chairmanship of Mr. R.M. Gould, Chief Industrial Commissioner of the Ministry of Labour.

It should be the basis of wage policy to make wage increases dependent upon increased production, and to make relative wage levels in different industries indicative of their relative importance in the national economy, At a time like this, when price-levels are to a considerable extent "artificial", this policy is not consistent with cost-of-living sliding-scale arrangements. These latter only serve to make even more automatic the operation of the "vicious spiral" of inflation.

Other Sliding Scales. The linking of wage-rates with sliding-scales other than the cost-of-living scale has been adopted in certain industries, but the majority of these schemes were abandoned during the recent War or replaced by cost-of-living scale arrangements. Outstanding among these was the agreement operating in the iron and steel and associated industries, where wages were periodically adjusted according to changes in the selling-prices of the output of the industries, e.g. pig-iron, which determined the wages of blastfurnacemen in some areas.

The usual procedure was for a base-rate of wages to be taken as corresponding to a certain selling-price, and for each variation of an agreed amount in this price a percentage was added to or subtracted from the base-rate. The ascertainment of selling-price was usually undertaken monthly or quarterly by joint accountants representing both employers and employees.

The plan is said to have worked smoothly for many

years, and to have earned for itself a high reputation as a factor in industrial peace, but it was not generally applicable to the fluctuating conditions of war, and in 1940 it was replaced in most cases by a cost-of-living scale. In the manufacture of coke and by-products in the Durham area, however, the price-scale system is retained; when the average realised price of coke at the ovens is at or under 18/- per ton, 30 per cent is added to the basic shift rates; for every increase of 4d. per ton up to 24/-, the percentage addition is increased by $\frac{1}{2}$ per cent, and for every increase of 6d. per ton thereafter by 1 per cent.

Coal.

Until 1944 there was an arrangement in the coal-mining industry whereby wages were periodically adjusted in accordance with variations in the proceeds of the industry in each district. The aggregate proceeds of the industry were ascertained from returns made by the owners and checked by auditors representing employers and men. Certain specified costs were deducted from this total, and the balance was divided in agreed proportions between wages and profits. This method of regulating wages was suspended for a period of at least four years under an agreement reached on 20th. April, 1944, and the percentage additions operative at that date were merged in the day- and piece-rates payable.

Whilst all these sliding-scale arrangements have their merits, they do not get to the root of the problem of the



CHAPTER

time-rate system. None of them gives to the worker that which daywork so sadly lacks, namely a direct incentive to increase efficiency, and without this incentive no wage-system can be said to be entirely satisfactory.

The authors of a standard work on the subject of incentives contain: "By emotional appeals may secure eighty or ninety per cent of the use of direct incentives; by the use of direct incentives may be secured only by an appeal there. What is equally important to maintain financial incentive tends to act keep efficiency from retrogression. Attention is diverted to other things."

There is no doubt that the use of incentives is an increasing proportion of work in all countries paid by one or other of these systems. This has been due to the first place, the increasing specialization of industry and the incentive of pride of craft and itself, and a financial incentive in the second place. Then again, the incentive to increase the maximum productivity of the worker by the prior plan of the

C H A P T E R VI.PAYMENT-BY-RESULTS.

It has already been suggested that the fundamental defect in the time-rate system of wage payment is the lack of direct financial incentive to improve production. The authors of a standard work on management problems contend: "By emotional appeals or driving, management may secure eighty or ninety per cent efficiency without the use of direct incentives; but some extra output can be secured only by an appeal through the pocket-book. What is equally important to management is that a financial incentive tends to act as a ratchet, and to keep efficiency from retrogression, when the management's attention is diverted to other problems." (1)

Reasons for
extension of
P. B. R.

There is no doubt that the present century has seen an increasing proportion of workers in the industrialised countries paid by one or other of the payment-by-results systems. This has been due to a number of reasons; in the first place, the increasing mechanisation and specialisation of industry has largely removed the old incentives of pride of craft and satisfaction in the job itself, and a financial incentive has had to be put in its place. Then again, two major wars in a generation have demanded the maximum productivity from a labour force reduced by the prior claims of the armed forces, and

(1) Balderston, Karabasz & Brecht: "Management of an Enterprise" pp. 200-201.

every avenue for securing an increase in output has had to be explored. Thirdly, there has developed an increasing consciousness among the working classes of their rights in society, which has led to the feeling that it is only just for a man to be rewarded according to the amount of work he performs. The traditional attitude of the trade unions has been in favour of the flat time-rate, but most good workers like to be rewarded for their superior skill and extra effort, and in the majority of cases the unions now accept payment-by-results but with certain reservations.

Quite apart from the incentive value of increased pay for increased work, payment-by-results seems to stimulate the desire to excel and introduces an element of interest and competition into the job, which to some extent compensates for its monotony. The mere fixation of standards for piece-work purposes sets the worker a target, gives him something to aim at, provides an opportunity for him to assert his importance and superiority, and thereby diminishes boredom and increases satisfaction in work. The managing director of one firm which has managed to increase production per man-hour by 216 per cent since 1938 claims that the secret is simply a combination of payment-by-results and democratic scientific management. He said "Without payment-by-results you haven't even started on output-boosting. Even when you get that it can yield no more than a 40 per cent boost. The next 20 per cent

increase can only come from the workpeople's willingness to co-operate fully in managerial suggestions." This particular undertaking augments its piecework system with an output competition. On the factory wall is a production chart in the form of a greyhound track, which, with three dogs moving round the rim, shows the progress of the various departments in the current month's production race. If the target is beaten, every worker gets a free packet of twenty cigarettes each month; if not, the lagging dog shews the section holding the team back - apparently an effective stimulus to greater effort next month.

Effect of
P.B.R. upon
management.

The fixing of standards for payment-by-results is also an incentive to improved management. Rate-setting - especially if time and motion study methods are employed - involves careful analysis of methods and organisation of production, which almost invariably shews up directions in which improvements may be effected. In this way efficiency is increased quite apart from the increase derived from the financial stimulus given to the workers to produce a greater output. Indeed, the workers who are paid by results can generally be relied upon to make sure that management does its part. If they are held up through bad organisation of factory routine, bottlenecks in the productive processes, badly maintained machinery, and the like, their bonus is affected, and there will be immediate demands for redress. Only if management is efficient can labour earn the maximum

bonus, and only if labour earns the maximum bonus (compatible with the maintenance of standards and the avoidance of undue fatigue) can management earn the maximum profits. Thus the interests of the two sides are made to coincide, and there is therefore a much better chance of success being achieved. Due to this coincidence of interest between management and men, supervision under payment-by-results does not need to be so strict as under the time-rate system, and this greater sense of freedom is appreciated by many workers.

Government
attitude to
P.B.R.

Both the Labour Government and the Conservative Opposition have recently endorsed payment-by-results. In the Government White Paper "Economic Survey for 1947"(1) it was stated "...Increased output per man-year is the only way to expand production and the standard of living. The way to effect this is by the organised combined effort of men, management, and machines....It is necessary to build up the factories into productive units of the highest efficiency....For this purpose also, the Government attaches great importance to the introduction of systems of payment and other arrangements which provide the maximum incentive to increase output...."

Opposition
attitude.

The recent statement of Conservative industrial policy(2) included the following paragraph: "We have already stated that it is our policy so to adjust direct

(1) Cmd. 7046.

(2) "The Industrial Charter".

taxation that extra effort is encouraged and not retarded. We wish to see such encouragement of effort adopted throughout the whole system of wage payments, as it is already in many industries. Basic wages there must be. But extra reward should always be linked with extra effort and initiative. There are many different ways of giving piece-rates and bonuses. The circumstances of each industry differ so greatly that we would not be dogmatic about the methods; but the adoption of the principle we regard as essential."

Russian
attitude.

Even in Soviet Russia where one might expect to find an economic system based on the maxim "from each according to his ability; to each according to his need", the once-despised payment-by-results systems are becoming more and more widely used. The collective agreements signed in April 1947 between the industrial trusts and the trade unions embody these principles.⁽¹⁾ There are fixed standard norms of output; production in addition to these is even better rewarded than hitherto, whilst output below the norm is penalised through decreasing scales of payment. These standard norms were raised by the 1947 agreements, so that in order to maintain his income, the worker has to produce more goods. Output over the standard norm earns no extra reward, moreover, if costs of production rise together with output, and in some industries lowering

(1) "Economist" 22nd. March, 1947.

of costs is made the condition for payment of bonus. Commenting on this situation, a writer in the "Economist" states: "The strong bias in favour of incentive wages in the past undoubtedly stimulated the growth of an elite of skilled workers in Russia; and to this extent it has been justified by the results. But an over-emphasis on incentive wages may also lead to undesirable consequences. The lower-paid worker becomes disgruntled and unwilling to produce. The enterprising individuals grow even more enterprising, while the unenterprising mass grows rather apathetic."⁽¹⁾ It would seem, however, that if the "unenterprising mass grows rather apathetic" despite the strong financial stimulus of an out-and-out payment-by-results system, it would be even more apathetic without it.

Disadvantages
of P. B. R.

It must, however, be conceded that payment-by-results is by no means a universal panacea; it is suited only to certain sets of circumstances, and even here it has certain disadvantages. Both employers and workers agree that wage incentives may lead to a deterioration in the quality of work produced; in his anxiety to earn bonus there may be a tendency for the worker to hurry unduly and so produce a shoddy job. Speaking at the 1947 Annual Conference of the British Association in Dundee, Miss Norah M. Davis referred to a pilot investigation⁽²⁾ she had recently

(1) Ibid. (2) "Report of a Pilot Investigation by Miss Norah M. Davis, M.A. on the Attitudes of Building operatives towards their Work and Working Conditions" (Industrial Health Research Board) 1947.

conducted into incentives to work in the building industry. Some of the actual comments of the men regarding P.B.R. were: "It scamps work and sets employees against each other." "It is bad for the workmen, the job and the community. It brings in bad feeling and shoddy work." "You can knock a screw in with a hammer quicker than put it in with a screw driver." Of the total number of operatives questioned (400 men) 14.25 per cent objected to payment-by-results for this reason. A joiner said "I badly want more money, but not by payment-by-results. Money's got too strong a pull. I'm afraid it would make me do bad work and then I should lose my self-respect. So I daren't risk it." There is, however, no reason in the majority of cases why adequate systems of inspection and quality control should not eliminate the danger of bad workmanship resulting from the introduction of payment-by-results.

Sometimes workers feel that piece-work, by increasing production per man-hour, will reduce the number of men required, and cause unemployment. That this fear had some considerable justification in times of depression there is little doubt, and the average man has little faith that the present post-war phenomenon of shortage of labour can be perpetuated by the politicians' and economists' plans for "full employment".

As Whiting Williams said: "Let a man live for years under the daily pressure of that narrow margin between job and no job, let him observe, day after day, that when some men work it appears to mean that for exactly that reason other men cannot work, then the most important factor in his whole life is sure to be the conviction that there simply isn't enough work to go round."

Then again, some contend that payment-by-results causes undue speeding-up which gives rise to excessive fatigue. Doubtless, wage incentives may cause excessive fatigue, but that in practice they do so is improbable, since, after the transition period is passed, workers tend to adjust their speed of working so as to avoid over-tiring themselves. They quickly realise that beyond a certain point the extra effort involved is not worth the extra bonus earned. Mr. H. M. Vernon of the Industrial Fatigue Research Board made some interesting investigations into this problem in 1928. (1) The men concerned were a group of seven "blendpullers" whose job it was to lift and move on trolleys cases of tea weighing 130 pounds. On time-rates they averaged 156 cases per day over a period of three months, but in the autumn of 1927 they were made the subjects of time-study, and were given a substantial bonus for all cases pulled in excess of a fixed minimum. In consequence their output rose

(1) Reported in the Journal of the National Institute of Industrial Psychology (London) January 1929.

steadily until in February the maximum figure of 323 cases was reached, more than double the normal number. The following week, however, there was a sudden drop to 270 cases, and it was quite obvious that the men were suffering from over-fatigue. Mr. Vernon writes: "The firm became seriously alarmed that the men, in their keenness to earn a large bonus, might be permanently injuring their health, and they asked my advice. As I have had considerable experience with men engaged in heavy work in coal mining, iron, steel and tinsplate production, where many of the men have to perform very arduous work at high temperatures, I was able to assure them that blend-pulling was not so strenuous as the work of these men, and that there was no inherent reason why the pullers should injure their health by over-exertion. They simply had not adjusted their effort to their working capacity. Most of the skilled men in the heavy trades mentioned are paid at a straight piece-rate, so they have an even stronger incentive than the blend-pullers to achieve a maximum output. Yet they manage, by long experience, to avoid a condition of over-fatigue." (1) After a warning from the management against over-exerting themselves, the men settled down to a steady average of 302 to 320 cases a day, and they neither complained nor shewed any signs of undue fatigue.

Wherever the product, the materials used, and the methods of manufacture can be sufficiently standardised so

(1) Ibid.

that differences in output will be almost entirely due to differences in skill or effort, there is a very strong prima facie case for payment-by-results. Even if this degree of standardisation is not possible, but the product is readily measured in quantitative terms, as for example in coal-mining, payment-by-results is still possible. Wage incentives designed to increase output are particularly advantageous where oncosts are very high, and in this case, even if neither conditions of work nor product can be standardised, there will be a strong tendency for payment-by-results to be introduced.

THE EXTENT OF PAYMENT-BY-RESULTS IN BRITISH INDUSTRIES.

In the majority of British industries payment-by-results is practised in one form or another, and to a greater or lesser degree. A recent survey⁽¹⁾ covering the major trades of this country shewed that 64.5 per cent of the firms questioned operated some kind of wage incentive scheme, although of these 10.8 per cent qualified their statements in that the schemes only applied to certain departments or certain occupations. An American investigation,⁽²⁾ concerned only with the machine and metal manufacturing industry, shewed that 77 per cent of the firms questioned employed payment-by-results schemes, the most popular being the "standard-hour" plan (40 per cent) and straight piece work (35 per cent).

Coal-mining. The coal mining industry has come to be regarded as one of the most important in the British economy, and in this industry piece-rate working is the normal practice among the direct workers underground, who number about 40 per cent of the total labour force. It is frequently found that the incentive power of the piecework system is limited for a number of reasons. In the first place the fear of rate-cutting has long been a deterrent to maximum output; men of different degrees of skill and physical

(1) "Personnel Management and Welfare" June 1947.

(2) "Factory Management & Maintenance" Sept. 1946 (U.S.A.)

ability sometimes unite in striking a common level of output - less than the potential output of the better workers - because to work harder and earn more would be to risk a reduction in their piecework rates. A retired mine-manager of long experience in the Scottish pits reported that when he started work as a young man in a Lanarkshire mine, he found that all the men working in squads of three or four to a "place" produced the same amount of coal, despite the fact that some were better workers than others. The better squads went home earlier than the others instead of working a full day and earning more money. On enquiring the reason for this, he was told that if they did so the tonnage rate would be reduced by the management, according to the pace set by the better workers. Sometimes a four day week only was worked - known in Lanarkshire at the time as the "Four Day Week Policy" - to achieve the same end.

Quite apart, however, from the question of rate-cutting, the stimulus of payment-by-results is limited in mining because of the peculiar and often very unpleasant circumstances of the industry. The ordinary face-worker, so long as he is physically robust, requires comparatively little training for his job, and a substantial wage can be earned by the fairly new recruit. Probably no other trade offers such quick returns to boys leaving school as mining does, and these circumstances tend to encourage

a short-term attitude to life. Then again, despite all the improvements of recent decades, mining is still an arduous and dangerous occupation, calling for sustained physical effort of a very intensive nature. The miner works in artificial light and in a cramped posture, with distinctly unpleasant conditions of heating and ventilation, so it gives little cause for surprise that the shorter the time he works, the better the miner is pleased. He soon reaches the point at which he regards the possibility of earning extra money by producing extra output as not worth the effort and discomfort involved, and after that point the power of the financial incentive fails.

Discussion with officials and miners alike confirms the view that further increases in wages and bonuses on production will do little to increase output, as, once the point at which the miner is able to satisfy his normal requirements is passed, an increase in earnings only tends to encourage absenteeism, due, not to wilful laziness, but to the pressure of unpleasant conditions of work.

There is, however, a case ^{for} ~~of~~ extending payment-by-results to oncost workers, perhaps in the form of a collective bonus based on a seam or colliery, in order to give these time-workers a more direct interest in the output of their pit, and to bring their wages more into line with those of the miners at the coal-face. The fact that the wages of indirect workers are considerably less than those of

workers at the coal face was the cause of a recent strike in Lanarkshire. (1) In one particular colliery, the men who set the machines for the removal of the coal were paid sixteen shillings a shift as against a possible thirty-five shillings for men working at the coal face.

Transport.

Transport is of necessity a time-rate industry for the most part. Obviously the running staffs - drivers, firemen, conductors, and the like - cannot be paid by results, although there are "mileage bonuses" for engine-drivers, and it has been suggested that an extension of the payment of bonuses for prompt running might improve rail and road time-keeping. The manufacturing and repair work undertaken by transport organisations affords opportunities for the introduction of piece-work and bonus systems, and in railway workshops payment-by-results is very commonly found. This type of work, however, comes under the heading of engineering, to be considered later.

Payment-by-results is extensively employed in dock work, and it is estimated that it now governs the pay of about 90 per cent of the workers. (2) Waterside work is extremely varied, and the piece-work schedules are consequently of a very complicated nature, the rates varying according to the type of cargo handled, loading

(1) October 1947.

(2) "Economist" 20th. Sept., 1947.

facilities at the dock, type of ship, and so on. Coal trimming and bunkering, and the handling of products such as grain, timber, ores, and other cargoes the quantity of which is easily calculable in terms of weight or measurement, lend themselves easily to piece work. Customs and conditions, facilities and mechanical equipment, vary widely from port to port, however, so that efficient local negotiating machinery for the agreement of rates and the interpretation of points of difficulty becomes an obsolete necessity. Despite the inherent difficulties of waterside work, payment-by-results seems to work comparatively smoothly, and it is beyond question that without it the turn-round of ships would be considerably slowed down.

Metal Trades. The iron and steel industry is very largely a piece-work industry; it was recently reported that incentive schemes of various kinds apply to about 85 per cent of the men in the industry. (1) This means that the direct workers are virtually all on some form of payment-by-results, the reason being that the product is more or less standardised and easily calculable on a tonnage basis for rate-fixing purposes.

Iron-founding falls into two broad groups, loose-box moulding, and the light casting trade. The former, in which the work is heavy, highly skilled, specialised, and organised on a job-production basis, is mainly a

(1) "Economist" 15th. November, 1947.

time-rate trade. The latter, the production of rain-water and soil gutterings, pipes, etc. is more repetitive in nature, and lends itself to piece-work. In the industry as a whole, about 40 per cent of the workers are on piece-work, but in the moulding trade (light castings) the proportion rises to 85 per cent. This is because the repetitive nature of the work makes it more easily adapted to piece-work conditions. For the rain water and soil goods there are national piece-work price lists; in other trades prices are fixed by mutuality so as to give an average of 33 per cent over time rate.⁽¹⁾ In all foundries there are large numbers of workers other than moulders, many of whom must be paid on a time basis because of the nature of their work. Payment-by-results has recently been extended to pattern-makers, formerly regarded as exclusively a time-rate trade. Prices are expressed not in money terms, but in terms of time; this "standard times system" obviates the difficulties involved in changing piece-work prices every time base rates are altered.

General
Engineering.

The structure of British engineering is extremely diversified, and as a consequence both payment by time and payment-by-results are very widely found. Historically, the engineering trade unions have for long objected to payment-by-results, but despite this there has been a definite expansion - particularly during the two World Wars - of the practice of paying on an output rather than a time basis. According to a recent Ministry of Labour (1) per National Light Castings Ironfounders' Federation.

Survey, just under half the workers employed in the engineering industry are now paid by results. (1)

Speaking before the National Arbitration Tribunal in December 1941, Sir. Alex. Ramsay, Director of the Engineering and Allied Employers' National Federation, gave the following figures:-

Category	Percentage of workers on	
	Time Wages	Piece Wages
Fitters	32.6	67.4
Turners and machine workers at or above fitters' rate	25.0	75.0
Turners and machine workers below fitters' rate.	20.6	79.4
Labourers	81.96	18.04
All classes combined	40.6	59.4

(1) "Ministry of Labour Gazette" October 1947. The detailed figures for April 1947 were:-

General Engineering and Iron and Steel		
Founding:	Timeworkers 54%	Pieceworkers 46%
Electrical Engineering:	46	54
Marine Engineering:	60	40
Constructional Engineering:	53	47
Motor, Cycle, and Aircraft Manufacture and Repair:	48	52

The above figures would cover some one and a half million workers in general engineering, and do not include railway workshop staffs. Of these latter, it has been estimated⁽¹⁾ that in 1944 some 49,000 were time workers and 51,000 piece-workers, whereas in 1939 the bulk of railway workshop staffs were on time-work. The increase in payment-by-results, both in the industry generally, and in railway shops particularly, would be partly due to the fact that in 1944 many workers were employed on munition work, which is more easily adapted to this method of payment, for it affords long runs of repetitive jobs.

Ship-building. Piece-work is very widely found in shipbuilding, since boiler-making, rivetting, drilling all lend themselves to this form of payment. Both standard price lists and mutual agreement of piece-rates are employed in the industry, and the effect of the two World Wars, with their desperate need for more ships both merchant and naval, has been to extend the scope of payment-by-results very considerably. The standard price lists are negotiated separately for each district, e.g. the Clyde and Tyneside areas, and there are lists for riveters, platers, drillers, etc. In rivetting, payment is made on a squad basis, in accordance with the standard price-list per 100 rivets. In hand rivetting the squad consists of two riveters, a holder-up, and a rivet heater; in machine rivetting, only one riveter is required per squad. The

(1) Dr. W. McLaine, Assistant General Secretary, Amalgamated Engineering Union, in the "International Labour Review" June 1944.

earnings of a squad are paid by the employer to the squad leader, and he makes the distribution among the members of his gang. In plating, the price-lists are individual yard lists, as the conditions of working are very important in this trade and they vary widely from yard to yard. For larger jobs, the "contract" method of piece-work is applied. Electricians, joiners, plumbers, shipwrights and painters were traditionally paid on day-rates, but during the war they changed over to the contract system of piece-work and this generally still operates. Lieu rates are paid to workers who are usually remunerated on a piece-work basis, but are working on ship repair work which is not considered suited to payment-by-results. Such men as rivetters, platers and drillers, who are usually paid on a piece-work basis would not be willing to go on repair work on time-rates without some additional incentive.

Wood-working. The woodworking crafts, comprising joiners, carpenters, coachbuilders, wheelwrights, patternmakers, and so on, are almost exclusively paid on a time basis. Indded, it has been the policy of the Amalgamated Society of Woodworkers to insist upon this. During the recent War, however, trade union rules were relaxed, and payment-by-results introduced, especially in the case of woodworkers engaged in the shipbuilding and ship-repairing trades.

Printing.

In the general printing industry the normal basis of payment is a straightforward time rate. There is a certain amount of piece-work, principally in the binding section of the industry, and there are some old-established piece-work price lists covering the composition of type for newspapers. Schemes of payment-by-results have not been generally introduced, although the matter has been discussed in the Joint Industrial Council, and has the support of many of the firms in the Industry, who hope that the traditional dislike of piecework may be removed.

Textile Trades: The wages of 47%⁽¹⁾ of cotton workers are paid on a piece work basis. Collective bargaining between trade unions and employers' associations is highly developed, and as a consequence, piece-work prices are fully organised in standard price lists, applicable over a considerable range of the industry. As the piece-work system is so important in the cotton industry, it will be dealt with more fully in a subsequent section.

Wool.

The system of standard piece-work price lists which is so highly developed in the cotton industry is not found to anything approaching the same degree in the other textile trades. Price-lists are certainly used in the woollen and worsted industry, but they are usually local lists, very much less intricate and comprehensive than those in the cotton industry. Payment-by-results, and the system of standard price-lists, is widely employed

(1) "Ministry of Labour Gazette" October, 1947.

in the hosiery trade, 67% of workers being on piecework. The lists are agreed and periodically overhauled and extended by joint committees of employers and trade union representatives, and this has resulted in much better industrial relations than obtained under the old regime whereby the employers agreed on and applied a rate for the job without consultation with the workers. The machine departments - frames, knitting machines and seamers - are usually on piece-work, whilst the boarders and indirect workers receive a set time-rate of pay.

Jute.

Both time and piece-rate systems are found alongside each other in the jute industry. There are flat time rates, and time-rates plus a "stent" or bonus on production, and there are schemes of group payment-by-results based on a number of different factors. Spinning is mostly done by female operatives who receive time-rates varying according to the number of spindles attended.

Footwear.

Of the workers in the boot and shoe industry, 54 per cent of adult males and 46 per cent of adult females are paid on a piece-work basis. A considerably larger proportion of workers in this industry was paid by results in 1939, the figures being: adult males 67 per cent: adult females 61 per cent.⁽²⁾ Here is an industry in which daywork is gaining ground at the expense of piecework.

As the product is more or less standardised, price-lists

(1) Ibid.

(2) From statement prepared by the Incorporated Federated Associations of Boot and Shoe Manufacturers of Great Britain.

can be employed, and these are prepared on a district basis, so as to give an average operative an earning capacity of 25 per cent over the minimum wage rates. It is regarded as a principle in the industry that as far as possible a uniform system of prices should obtain, applicable or adaptable to the same class of labour and materials in all areas producing similar classes of goods. (1)

The reasons for the decline in the proportion of piece-workers in the boot and shoe industry during the years 1939-1947 are various and not at all clear, but the change is primarily due to factors arising out of the war situation. It is estimated that as many as 50 per cent of the normal labour force were lost to the Forces and other industries during the war, and this loss was naturally from the younger and more active workers, among whom the proportion of piece-workers before 1939 would have been above the average. They were replaced by temporary workers as far as possible, and these came on to daywork.

Then again, in the severe competition of the pre-war years, it was absolutely essential that a manufacturer should know his labour cost accurately, and that this labour cost per unit of output should not rise rapidly in the event of falling off in total output due to shortage

(1) National Conference of Representatives of the above Federation, and the National Union of Boot and Shoe Operatives: Agreement of January 1946.

of orders for any cause. It was the practice in the boot and shoe industry that pieceworkers had no guaranteed minimum rate of wages; they were merely paid what they earned on piece-work.

There is now a tendency for the proportion of pieceworkers to rise again, and with the re-establishment of more settled labour conditions in the industry there is no reason why the percentage should not rise to or even higher than the pre-war level.

Summary

The various methods of payment-by-results are, therefore, very widespread throughout the major part of British industry. Asked recently⁽¹⁾ in the House of Commons what percentage of workers engaged in productive capacities were affected by payment-by-results arrangements, the Minister of Labour replied: "Amongst the manual workers employed by firms in manufacturing industries in April last, 30 per cent were paid by piece rates or by other forms of payment-by-results."

The two tables ⁽²⁾ appended to this chapter shew the estimated percentages of time- and piece-workers in various industries, and in all the industries combined, for April 1947 and October 1938 respectively. The wide variations between the various industries are noticeable, extending from none on piece-work in public utility

(1) 25th. November, 1947

(2) Extracted from "Ministry of Labour Gazette"
October, 1947.

Percentage of Time and Place

In October, 1943, calculated

services to 46 per cent in the metal trades, engineering and shipbuilding. Over the whole range of industries there has since 1938 been a slight increase in the proportion paid by results. The increase would have been much more marked had not the rise in the proportion of males on piece-work been offset by a substantial fall in the proportion of women 18 years of age and over. This latter is in all probability merely a post-war phenomenon, and it is anticipated that the general trend will be towards an extension of payment-by-results under the stimulus of the need for increased output.

Food, Drink and Tobacco	74
Engineering	82
Paper, printing,	86
Chemicals, etc.	
Textiles, clothing, etc.	96
Metals, etc.	96
Transport, storage, etc.	95
Electricity, gas, etc.	95
Public utility services	95
Government industrial establishments	95
All the above	77

Excluding wage-earners in Army

Percentage of Time and Piece Workers, etc., employed in April, 1947 and in October, 1938, calculated on the basis of the total numbers employed in each industry.

Industry Group.	Men (21 years and over)		Youths and Boys (under 21 years)		Women (18 years and over)		Girls (under 18 years)		All Workers	
	Percentage of Time and Piece Workers in the last pay-week in April, 1947.									
	Time	Piece	Time	Piece	Time	Piece	Time	Piece	Time	Piece
Iron, stone, etc., mining and quarrying	72	28	93	7	-	-	-	-	73	27
Treatment of non-metalliferous mine and quarry products	84	16	89	11	77	23	-	-	83	17
Brick, pottery and glass	68	32	77	23	56	44	67	33	66	34
Chemical, paint, oil etc.	92	8	94	6	85	15	86	14	90	10
Metal, engineering and ship-building	54	46	62	38	48	52	54	46	54	46
Textiles	73	27	87	13	42	58	56	44	57	43
Leather, Fur, etc.	66	34	83	17	77	23	80	20	70	30
Clothing	73	27	86	14	64	36	71	29	68	32
Food, drink and Tobacco	94	6	95	5	81	19	84	16	89	11
Woodworking	82	18	90	10	78	22	82	18	83	17
Paper, printing, stationery, etc.	96	4	99	1	80	20	86	14	91	9
Building, contracting, etc.	98	2	100	0	93	7	-	-	98	2
Miscellaneous manufacturing industries	65	35	75	25	58	42	66	34	63	37
Transport, storage, etc. (excluding railways)	98	2	100	0	98	2	-	-	98	2
Public utility services	99	1	100	0	100	0	100	0	100	0
Government industrial establishments+	90	10	92	8	79	21	90	10	89	11
All the above	77	23	82	18	62	38	69	31	74	26

+ Excluding wage-earners in Admiralty establishments.

Industry Group.	Men (21 years and over)		Youths and Boys (under 21 years)		Women (18 years and over)		Girls (under 18 years)		All Workers	
	Percentage of Time and Piece Workers in the last pay-week in October, 1938.									
	Time	Piece	Time	Piece	Time	Piece	Time	Piece	Time	Piece
Iron, stone, etc., mining and quarrying	73	27	91	9	-	-	-	-	73	27
Treatment of non- metalliferous mine and quarry products	85	15	91	9	70	30	60	40	85	15
Brick, Pottery and glass	66	34	76	24	49	51	71	29	65	35
Chemical, paint, oil, etc.	95	5	95	5	76	24	85	15	91	9
Metal, engineering and ship-building	61	39	61	39	45	55	58	42	59	41
Textiles	71	29	86	14	36	64	65	35	55	45
Leather, Fur, etc.	66	34	88	12	77	23	86	14	73	27
Clothing.	64	36	87	13	59	41	78	22	65	35
Food, drink and Tobacco	92	8	95	5	73	27	83	17	86	14
Woodworking	87	13	91	9	74	26	81	19	85	15
Paper, printing, stationery, etc.	95	5	97	3	71	29	86	14	88	12
Building, contracting, etc.	100	0	99	1	-	-	-	-	99	1
Miscellaneous manufacturing industries	73	27	77	23	58	42	66	34	69	31
Transport, storage, etc. (excluding railways)	97	3	99	1	97	3	-	-	98	2
Public utility services	99	1	99	1	99	1	100	0	99	1
Government industrial establishments	81	19	72	28	76	24	-	-	80	20
All the above	82	18	79	21	54	46	73	27	75	25

For these and other reasons the cotton industry has
been "the natural home of piece-work system" (1).
until the Second World War the building industry was

(1) G. D. H. Cole "Great Britain from Adam Smith to the
Present Day" p. 400.
(2) G. D. H. Cole "Fragments of a History of the
Present Day" p. 13.

CHAPTER VIII.PAYMENT-BY-RESULTS IN THE COTTON AND BUILDING INDUSTRIES.

In order to illustrate how the principle of payment-by-results can be applied in industries of totally different character and circumstances, a brief description will be given of the position in the cotton and building industries. The former is highly organised, and provides "the classical example of territorial centralisation",⁽¹⁾ being highly localised in East Lancashire and North Cheshire. The latter is composed of a multitude of firms varying in size from the very small undertaking employing three to four men to the public works contractor or speculative builder employing a very large working force. There is no concentration of the building industry in any one part of the country; it is scattered throughout the realm. The products of the spinning section of the cotton industry are highly standardised, and there are broad groups of products in the weaving and finishing sections. The products of the building industry, on the other hand, vary from the household garage to the factory covering acres of land.

For these and other reasons the cotton industry has been "the natural home of piece-work systems"⁽²⁾ whereas until the Second World War the building industry was

(1) C.R. Fay "Great Britain from Adam Smith to the Present Day" p. 289.

(2) G.D.H. Cole "Payment of Wages" p. 13.

traditionally a time-rate industry whose unions were adamant in their refusal to accept payment-by-results in any form. However, on the 20th. October, 1947 agreement was reached whereby the principle of payment-by-results was introduced into the building industry, despite all the difficulties involved in applying it to an industry which had always been considered unsuitable for such methods.

I. COTTON. (1)

The principal sections of the cotton industry are (i) Spinning and Doubling, i.e. making the yarn and twisting it into thread, (ii) Weaving yarn into cloth, and (iii) Finishing the cloth by bleaching, dyeing, printing, and so on. The cotton industry is highly specialised, being composed of a large number of firms each confining itself to a narrow range of functions within each stage of production.. Vertical integration, that is the association of firms in successive stages of production, is comparatively rare, and the firm usually confines itself to one or other of the following six groups: (1) the Liverpool merchants and brokers,

(1) The structure of the cotton industry is well documented, e.g. vide:

Chapman: "The Lancashire Cotton Industry" 1904

Todd: "The Cotton World" 1927

Committee on Industry & Trade "Survey of Textile Industries" 1928.

Allen: "British Industries and their Organisation" 1933 chap. 8.

Report of the Cotton Working Party. H.M.S.O. 1946.

The "Evershed" Report H.M.S.O. 1945.

(2) the spinners, (3) the yarn merchants and brokers, (4) the weavers or manufacturers, (5) the finishers, and (6) the piece-goods merchants. Thus, not only is production organised horizontally, but distribution is also detached from production. It was, however, the opinion of the Cotton Working Party that "a definite tendency towards vertical integration appears now to be at work either in the form of converters reaching back to acquire manufacturing interests or, conversely, manufacturers taking control over the distribution of their products. This tendency, however, has not been strong enough to bring about a radical change in the sectional structure of the industry." (1)

Cotton
Spinning.

The spinning firms are for the most part larger than the weaving firms, and most of the mills are owned by public limited companies. There has been a considerable amount of horizontal combination in the spinning industry, and there are now five very large combines, and other groups of mills working together with a community of interests, sometimes effected by the device of "interlocking directorates". The position is shewn statistically below:- (2)

(1) Report 1946 p. 37.

(2) Ibid p. 39.

Size of Spinning Firms - 1940

Number of spindles (mule equivalent)	Firms	Spindles (million M.E.)
Less than 20,000 spindles	23	0.3
20,000 to 40,000 spindles	38	1.0
40,000 to 80,000 spindles	78	4.5
80,000 to 200,000 spindles	110	13.0
200,000 to 1,000,000 spindles	26	7.1
More than 1,000,000 spindles	5	13.2
Total - all firms	280	39.1

Collective bargaining between employers' associations and trade unions has reached a highly developed stage in the cotton industry, and as a result piece-work prices are codified into standard lists. Although the individual operations involved in the manufacture of cotton goods are extremely numerous and complicated, they can for the most part be reduced to standard elements. Then again, the output of the cotton industry is largely standardised, and can be measured in terms of yardage. Although conditions in the various mills vary widely, and the efficiency of the machinery employed is by no means constant, nevertheless mechanisation and standardisation are of such a degree that, within limits, a given amount of effort and skill can be relied upon to produce a given output. Thus it is possible to frame a standard list setting out in detail the prices to be paid for all the various operations to be performed in both spinning and weaving.

Mule-
Spinning.

There are six mule spinning lists in use at the present time, known as the Oldham, Bolton, Ashton, Hyde, Preston and Blackburn lists. The two first-named are by far the most important, covering as they do about 80 to 90 per cent⁽¹⁾ of the total mule operatives. These lists are all extremely complicated and completely unintelligible to the layman; it is reported⁽²⁾ that even such experienced investigators as Sidney and Beatrice Webb were forced to confess that "the principles upon which the lists are framed are so complicated that we...are still perplexed on certain points..."

The basis upon which the piece-price is calculated in each list is not the same, and the lists fall into two broad groups in this regard. The process of spinning consists in twisting together the raw cotton fibres in order to make yarn, and in order to measure output one must measure the length of yarn produced and the number of twists given to the yarn per unit of length. The amount of twist is closely connected with (a) the fineness, or "count" of the yarn, and (b) the speed of the spinning machine.

(a) Generally speaking, the finer the yarn the more turns per inch are required in order to give the necessary strength. Therefore, the finer the yarn, the longer it

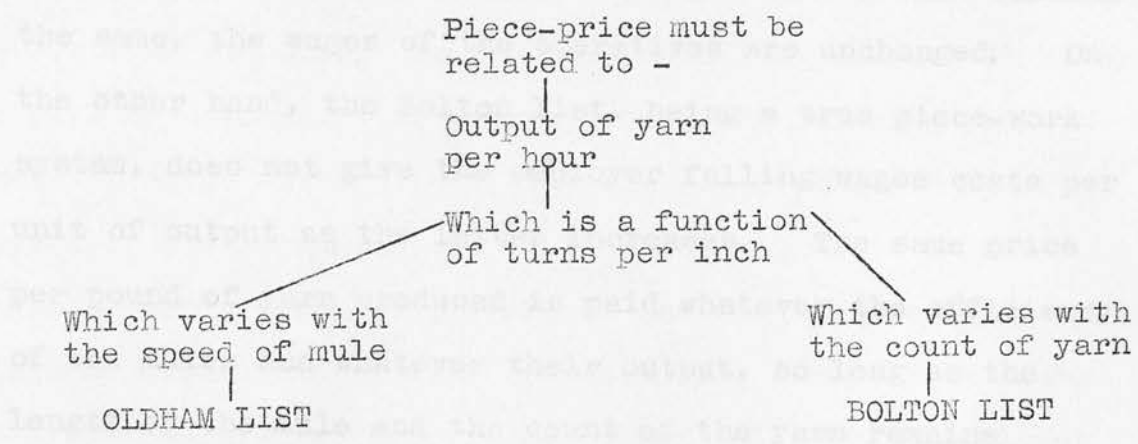
(1) Evershed Report 1945.

(2) Jewkes and Gray: "Wages and Labour in Cotton Spinning" p. 55.

takes to spin a unit of length, and this is the variable which is made the basis of the Bolton, Ashton, Hyde, Preston and Blackburn lists. In these lists the piece prices vary according to the fineness of the yarn produced.

(b) Again, the speed at which the mule can work depends largely upon the number of turns per inch inserted in the yarn; the larger the number of turns required, the slower the speed of the mule, and the less the amount of yarn produced per unit of time. Thus, the speed of the machine can be made the basis for piece-work price fixing, and this is done in the case of the oldham list.

Messrs. Jewkes and Gray, in their standard work on labour conditions in the cotton spinning industry, (1) illustrate the principles by the following diagram:-



The Bolton List is much more a true piece-work list

(1) Jewkes & Gray "Wages & Labour in Cotton Spinning" p.57.

than the Oldham, since it gives a certain price for each count of yarn and each length of mule, and a man's earnings are simply calculated by multiplying his output by the appropriate piece-price. The Oldham list, on the other hand, has certain elements of a time-rate system in it, for it stipulates that the weekly wage of all operatives working on mules of a given length shall be approximately the same. This means that a piece-price has to be calculated (bearing in mind the speed of the mule) which will enable this wage to be earned, and the result is much the same as would follow from a simple time-rate system. (1)

Under the Oldham system the main financial incentive is not to the operative, but to the employer, since if he succeeds in increasing the efficiency of his machinery and secures a high production per mule, his labour costs are reduced, because so long as the length of the mule remains the same, the wages of the operatives are unchanged. On the other hand, the Bolton list, being a true piece-work system, does not give the employer falling wages costs per unit of output as the latter increases. The same price per pound of yarn produced is paid whatever the efficiency of the mules and whatever their output, so long as the length of the mule and the count of the yarn remains unchanged. The employer, however, has the benefit of

(1) For a full description of the method of calculating wages under the various lists, see Jewkes and Gray: "Wages and Labour in Cotton Spinning" chaps. 4 to 8.

falling overhead costs per unit of output, as production goes up. Whereas under the Oldham system provision is made for dividing the advantage gained from improved techniques between the operatives and the mill-owners, the other lists give the advantage entirely to the operative.

The principle of standard price-lists is very old; Chapman⁽¹⁾ mentions lists existing in 1813 and 1836, but the present lists are of much more recent date. The first really comprehensive Oldham list dates from 1869, and the present Bolton list from 1887, so that sufficient time has elapsed since their inception to allow of a considered judgment as to the effectiveness of their working in actual practice.

Ring-Spinning.

Ring-spinning - by far the most popular method of spinning in other countries - is gradually usurping the place of mule-spinning in Lancashire. Whereas mule spinning operatives are always men or boys, the ring spinner is always a girl or a woman. In mule-spinning the labour-unit is a team of three - the minder, the big piecer and the little piecer; the ring-spinner, on the other hand, is a semi-skilled worker and works alone on her ring frames. Owing to lack of organisation, ring spinners have always been among the lowest-paid workers in the cotton industry, and it was not until 1912 that the desire to improve their conditions

(1) Chapman: "The Lancashire Cotton Industry".

resulted in the establishment of the Universal List for Ring Spinning. This system embodies elements from both the time-rate and piece-rate method of wage payment; there is a weekly wage for each hundred spindles tended by the operative, irrespective of output, but this standard wage varies with two factors: (i) the count of the yarn and (ii) the amount of twist to be put into it. This can be seen in the following extract from the list:-

<u>Universal Ring Spinning List</u> <u>Wages per 100 Spindles</u>				
Counts	Yarn with normal twist		Yarn with extra hard twist	
	s.	d.	s.	d.
8's	3	7.243	3	1.188
10's	3	3.783	2	9.729
12's	3	1.188	2	7.134
14's	2	9.729	2	7.134
18's	2	7.134	2	5.405
24's	2	5.405	2	4.107
34's	2	4.107	2	1.945
42's	2	2.811	2	1.945
43's & upwards	2	1.945	2	1.945

Cotton Weaving.

There are many more weaving firms than spinning; most of them are private limited companies or partnerships, and the average size of the units is much smaller than in the spinning section of the industry.

Like the spinning lists, the weavers' list is extremely

(1) Report of Cotton Weaving Party 1945 p.43.

Size of Weaving Firms - 1940 ⁽¹⁾				
No. of Looms	Firms	Looms (000)	Percentage of Total	Average No. of looms per firm
Up to 200	438	38	7.6	87
200-400	194	56	11.2	288
400-800	253	146	29.2	577
800-2,000	153	177	35.4	1,157
2,000 -2,500	13	30	6.0	2,315
2,500-3,300	8	23	4.6	2,901
3,300-6,600	-	-	-	-
6,600-9,400	4	30	6.0	7,509
Total	1,063	500	100	470

Despite the smaller degree of integration present in the weaving section, standardisation of piece-work prices is even more more complete than in spinning. There is now a uniform weaving price-list in general use in North and North-East Lancashire, and it governs the wages of almost the entire industry. This list developed out of the early lists negotiated by individual firms, followed later by district lists, which eventually gave way to the "Uniform List of Weaving Prices" legalised under the Cotton Manufacturing Industry (Temporary Provisions) Act 1934. This list governs the wages paid to the weavers of grey and coloured cloths, and provides for a varying number of looms per weaver, such as (i) up to four looms per weaver (ii) six looms per weaver and (iii) more than six looms per weaver. Like the spinning lists, the weavers' list is extremely

(1) Report of Cotton Working Party 1946 p.41.

complicated, and it is practically impossible for anyone without a technical knowledge of the industry to calculate a wage from it. There are also separate piece-work price lists governing the weaving of velvet and fustian cloths, sheeting cloths, waste cloths, towels and quilts.

Briefly described, the Uniform List works thus: each time the shuttle moves across the loom it leaves behind a single thread, known as a "pick", so that it is possible to calculate the length of a piece of cloth by the number of picks which it contains. This is the basis of the price-list, according to which the weaver's wage is calculated on the number of picks put in by the loom.

This was a satisfactory method in the old hand-loom days when the major part of a weaver's work consisted in throwing the shuttle by hand across the loom, but nowadays the machine inserts the pick, and the weaver's principal task is to keep the loom running for as great as possible a proportion of her working day. The stops which she tries to reduce to a minimum are caused by (a) changing the shuttle to renew the supply of weft, and (b) repairing breaks in the warp threads. Both of these factors are to a large extent outside the weavers' control, the first depending on the length of yarn in the shuttle, and the second upon the quality of the yarn employed. The piece-work system does ensure, however, that these stoppages will be reduced to a minimum, that is to say,

the effect is similar to that of the piece-work system operating in cotton spinning.

The standard price-list system only applies to non-automatic looms, but these make up 96 per cent of the total number of looms in the industry.⁽¹⁾ In the case of automatic looms separate arrangements are made at individual mills and in different districts. This type of weaving is usually paid on a fixed wage system, plus bonus for efficiency, as distinct from the piece-work system (with fall-back or guaranteed wage) found in the non-automatic section.

Summary.

How far is the system of piece-work price-lists found in the cotton industry conducive to increased productivity? Two questions are involved: (a) does it encourage operatives to produce more; and (b) does it encourage mill-owners to increase the efficiency of their machinery and methods?

Cotton spinning is one of those trades where output is only to a limited extent under the control of the operative, the most important element being the speed and efficiency of the machine itself. Then again, in the case of mule-spinning, only the minder is paid by results, the two piecers being paid by time, but the fact that the main charge of the mule is on piece-work will cause him to see that the piecers do not reduce his earnings by low output.

(1) Ordinary looms: 468,654) Figures for 1939 taken from
Total looms: 488,333) Cotton Working Party Report
p. 42.

There is little doubt that the piece-work system does mean that yarn breakages are repaired more quickly, and the mule kept working at an efficiency nearer to its maximum, than would be the case if wages were paid on a time basis.

As regards the second question, it has already been mentioned that the main incentive of the Oldham list is to the employer, encouraging him to lower his labour costs by increasing the efficiency of his machinery. Under the Bolton system, increased efficiency does not give the mill-owner lower labour costs per unit, but it does mean lower overheads, and there is, therefore, still some incentive to the employer.

Neither the Cotton Working Party nor the Evershed Commission recommended that there should be any general change-over to time rates of wages in the cotton industry, although the latter body felt that the present system was "an unnecessarily complex" structure which could "no longer be justified under modern conditions"⁽¹⁾ and the Commission recommended "the formation of a single list to take the place of the existing lists." A considerable amount of criticism has also been levelled against the Universal List for weaving. There is no doubt that it has served well in the past, protecting the weaver against exploitation and undercutting of wages in times of bad trade, but in its present form it has outlived its usefulness. The piece-rate for any particular cloth

(1) "Evershed" Report on the Cotton Spinning Industry 1945 para. 77.

remains the same however much the manufacturer tries to increase the efficiency of his plant by improving the looms or using better quality yarn; apart from a possible reduction in overheads, the employer gets no benefit from such improvements. (1) Since one of the principal aims of the piece-work systems is to link reward with effort, a price-list which largely overlooks the two principal factors (shuttle changes and yarn repairs) which determine the effort required from the weaver cannot really be satisfactory. If it tends to perpetuate inefficient methods of production in an industry so vital as is Lancashire cotton then "the Uniform List must go". (2)

All these criticisms, however, with regard to both spinning and weaving, are levelled against the particular lists at present in existence, not against the piece-work system as such. It is significant that none of the investigating bodies, critical as they have been, has recommended abandoning piece-work; changes in procedure rather than principle have invariably been the suggested remedies.

(1) For a description and criticism of the Universal Weaving List, vide the Interim Report of the Cotton Manufacturing Commission (the Moelwyn Hughes Commission) 1948. H.M.S.O.

(2) Ibid: para. 59.

II. BUILDING INDUSTRY.Pre-war
Position.

The building industry provides some interesting material in connection with payment-by-results, for it has in recent years been the scene of an ambitious experiment in the application of the system to an industry which has traditionally been regarded as suitable only for the day-rate method. The trade unions in the building industry have always been adamant in their refusal to accept payment-by-results in any form, and have been committed by their constitutions to time-rates only. Indeed, the Working Rule Agreement for the Northern Region (Northumberland and Durham), the Manchester area, and Scotland expressly prohibited payment-by-results. Hostility was not so great in the civil engineering branch, and the Agreement of the Conciliation Board for this industry provided for the payment of bonuses in addition to time-rates. There was, however, no general scheme, but individual employers and workers negotiated their own arrangements for the particular job in hand. Even in the building trade unofficial schemes of payment-by-results were quite common, frequently being of the sub-contract type. For example, one large contractor was told by the union officials that if it was discovered that he had any men working on a piece-work or similar basis, they would "blackball" his contracts in any part of the country. Despite this threat he put out the bricklaying work on

sub-contract to leaders of gangs of tradesmen, for an agreed price per house, and the work was completed in two years instead of three. and at a profit of 166 per cent more than the anticipated amount.

War-time
needs.

The military situation following on the Dunkirk period during the Second World War became so acute that in the spring of 1941 the Government decided that something must be done to increase the productivity of the workers engaged upon the building programme connected with essential works of various kinds. The younger men having been called to the Colours, there was an acute shortage of the best workers, and the average age of the remainder was much above the normal. Workers who had been directed to building under the Essential Works Orders were inexperienced, and the output of the industry was quite inadequate to meet the urgent needs of the war situation. For this reason, the Government announced its intention of introducing a system of payment-by-results on all essential works, the arrangement to be only a temporary "change of practice" which would be abandoned after the War unless continued by mutual agreement.

July 1941
Government
scheme.

This intention was carried into effect in July 1941 by the Essential Work (Building and Civil Engineering) Order, 1941, which made it compulsory to pay on an output basis wherever possible on scheduled undertakings or sites, which at that time comprised practically all the work being done. A Joint Advisory Panel was formed,

drawn from both sides of the industry, to assist the Ministry of Works in developing and administering the scheme. Regional Payment-by-Results Advisers were appointed by the Ministry to cover the whole country; they were men with wide experience of the buildings and public works industry, and were in a position to advise contractors and others on points of detail in the administration of the scheme.

Basis of
the Scheme.

The method of bonus payment which had become customary in the civil engineering industry, namely bonus payable for all work over a fixed hourly output, was adapted under the Government Scheme to the building trade. Basic output rates for the various operations were fixed⁽¹⁾ and a worker who exceeded this target became entitled to a bonus in addition to his hourly rate, the bonus representing two-thirds of the saving in labour cost resulting from the increase in output. This was an adaptation of the well-known "Halsey" system of premium-bonus, a method which is discussed fully in a later section.

For example, the basic output for unloading and stacking bricks (one throw) was 500 per man-hour⁽²⁾. Therefore, a man was allowed two hours to stack a thousand bricks. If he completed the job in, say, an hour and a half, he was entitled to receive his ordinary labourer's rate of pay of

(1) "Memorandum on Payment by Results, including Schedules of Trade Operations for which Bonus Rates have been fixed" H.M.S.O. 1944.

(2) Ibid. Appendix A; Schedule 1.

1/6d. per hour plus a bonus calculated thus:-

Time saved: $\frac{1}{2}$ hour

Bonus: two-thirds of time saved
= 6d.

Therefore, total pay = $1\frac{1}{2}$ hours at 1/6d. per hour, 2/3d.
plus bonus, 6d. = 2/9d.

A simplified method of calculation was adopted for the benefit of contractors; the schedules indicated the amount of bonus due for each unit of output above the basic. In the case quoted above, the bonus was 2/- per 1000, and since the worker stacked in an hour and a half 250 more bricks than the target figure, he was entitled to a bonus of 6d.

The bonus rates were based on time-rates of 2/- per hour for craftsmen and 1/6d. for labourers, and allowances were made where plus-rates were in operation. The bonus rates were uniform, regardless of district differences and changes in time rates from time to time. The basic output in each case was fixed with regard to normal working conditions, and if particularly difficult conditions of working were encountered, "site adjustments" were authorised, on an agreed basis.

Indirect workers, whose output could not be directly measured, received bonuses based on the bonus earned by the various direct workers whom they assisted. Chargemen were included in the bonus scheme, and they shared in the bonus earned by the gang for which they were responsible, but foremen and other supervisory staff were outside the

scheme altogether.

Bonus was calculated on a weekly basis, and normally based on the output of the gang, each member sharing the bonus in proportion to the number of hours worked by each, and the individual time rates.

Working of
the Scheme.

There is no doubt that the scheme had a beneficial and stimulating effect on production per man-hour, although an objective assessment is difficult to make owing to the lack of statistics with regard to output in the building trade prior to the War. However, the Payment by Results Joint Advisory Panel made a number of investigations into this problem, and in October 1943 a special Committee was established to consider the effect on output, and the cost, of the Government Scheme. Representative contractors were asked to submit evidence on the output position in (i) 1939, (ii) immediately prior to the introduction of the payment-by-results Scheme in 1941, and (iii) at the time of the enquiry. The Committee reported that the decline in output compared with 1939 had been arrested, and that output in 1943 was greater than in 1941, although labour costs had also increased. In work such as concreting and bricklaying increases in output of 25-30 per cent were common, but if the contract as a whole, including preparatory and finishing work, was considered the increases were less marked.

A comparison of actual output with the target figures can, however, be fairly accurately made, and the following

table shows the position in the major branches of the trade:-

Average level of Output in Relation to Basic in the (1) Main Trade Schedules			
Operation	Average actual Output as % increase over basic	Operation	Average actual output as % increase over basic
Unloading materials	62%	Asbestos cement	
Machine excavation	50	sheeting	48%
Hand excavation	7	Painting	28
Hardcore	18	Glazing	48
Concreting	39	Hutting	67
Reinforcing Steel	35	Hollow tile floors	
Scaffolding	55	and roofs	41
Brickwork	38	Track laying	51
Pipelaying	27	Pavings	28
Tarmacadam	41	Opencast coal	
Kerb fixing	47	production	63
Carpentry & Joinery	29	Wall and ceiling	
Plastering	36	linings	23
Average actual output on all operations covered by scheme, weighted by volume of work recorded = 34% over average basic output.			

Whilst the increases over the basic output are substantial, it must be borne in mind that the targets set in the scheme were definitely low by comparison with pre-1939 normal output. However, there is little doubt that the Scheme did a great deal to increase production per man-

(1) "A Report on the Operation of the Payment by Results Scheme Applied under the Essential Work (Building and Civil Engineering Order, 1941, during the Period July, 1941 to March 1947" H.M.S.O. 1947.

hour, and the division of the bonus between employer and employee gave an incentive to both to step up output.

Among Departmental observations on the working of the Scheme were the following:-(1)

Ministry of Supply: "The general reaction of operatives to the system is favourable and men responded well by increased effort after original prejudice in some cases was overcome..."

Petroleum Department: "Reports show that there was in general an excellent reaction on the part of the operatives to the bonus system; the men were interested in the results, and absenteeism was negligible. Since the introduction of the system, work has been considerably accelerated and marked progress achieved."

Ministry of Health: "Results in operating the system have been influenced by the different conditions prevailing on sites. On the whole the operatives concerned have favoured the scheme.... Output has been affected in some cases by weather conditions, but the general results have been satisfactory, and in some instances have been described as excellent."

Ministry of Aircraft Production: "Output in general was good but in a few cases men fix their own earnings target and limit their effort accordingly. In other cases the

(1) Ministry of Works Information Sheet issued in June 1942, i.e. approximately a year after the introduction of the scheme. It reported that "there was an average increase over basic output for March of 42%; this rose to 61% for April."

men were inclined to slack off when targets fixed on sites were reached."

Quality of Work.

The Advisory Panel which investigated the working of the scheme found that where supervision was efficient, and there was adequate inspection of work in progress, standards of quality were properly maintained. It is frequently maintained that payment-by-results gives rise to shoddy workmanship, and whilst this may in certain cases be true, it is not necessarily so. The wage incentive, by encouraging the men to maintain a steady rate of working, avoiding unnecessary delays and waste of time, should release the supervisory staff to some extent from the task of maintaining discipline, and enable them to pay more attention to the maintenance of the required standards of quality. Under the Government scheme, bonus was not paid on work which was found at the time to be faulty, and this factor no doubt contributed to efficient working so far as quality was concerned.

Effect on Management.

It was found that the scheme tended to increase the efficiency of organisation of work, for a number of reasons. In the first place, the regular reports on the amount of work completed, the time spent on bonused and non-bonused work, and the necessity for a regular measurement of results achieved, undoubtedly had a beneficial effect on management. Again, since the men's earnings were affected by delays due to bad organisation, their interest in the organisation of the work increased, and valuable

suggestions were forthcoming from the workers themselves, which had a salutary effect on site organisation.

Post-war situation.

The war-time scheme of payment-by-results only applied to sites scheduled under the Essential Work Order, and the Government would not recognise bonus schemes for building operations on any non-scheduled work. Indeed, Defence Regulation 56AB definitely made it an offence to pay bonus rates. During the War, of course, the vast majority of building was for essential purposes, but when the war was over more and more domestic work was undertaken. This led to endless discussion on the merits and demerits of payment-by-results, and on the output of the post-war building workers as compared with the 1939 position. A surveyor of repute reported the following experience, which he claimed was typical of the post-war situation in London, especially on small jobs:

London Surveyor's Report.

(i) Surveyor arrives on job at 12 noon to inspect work. No men on site. He is informed that the men have gone to dinner.

(ii) Surveyor returns to job at 1.15 p.m. Still no men on site. He leaves a message with the tenant of the house to note time of men's arrival.

(iii) Surveyor returns at 3 p.m. He is informed that the men arrived back at 2.15 p.m., but had now gone for their "tea-break".

(iv) Men arrive back at 3.15 p.m.

The surveyor was powerless to stop such incidents, because if he complained the men left the job for another one, and contractors would not take on his jobs if they thought they would lose their men:

Mr. Marple's Experiments.

In June 1947, Mr. A.E. Marples, M.P., himself a builder, made a speech⁽¹⁾ in the House of Commons, urging the adoption of payment-by-results in private building. He quoted the experience of Lord Quibell, another practical builder, who found that when bricklayers were paid at the regulation rate they laid approximately 250 bricks a day, but when they were paid by results their output rose to 750 bricks a day. Mr. Marples himself had made interesting experiments in this field; on one of his building sites the bricklayers were paid time rates; on the other a bricklayer was made a sub-contractor, so that in effect he was paid on a piece-work basis. On the first site, the men laid on an average 63 bricks per hour; on the second site, the men on piecework were laying 103 bricks per hour. Mr. Marples urged the Government to abolish Defence Regulation 56AB, and the unions to revise their attitude to payment-by-results - "to face the future instead of the past".

Edinburgh Housing Committee's Report.

In the Autumn of 1947 the Scottish Building Costs Committee prepared a questionnaire to local authorities on the building situation. The Housing Committee of

(1) Reported in "The Illustrated Carpenter and Builder" 4.7.47.

Edinburgh Corporation reported that the average cost of a four-apartment flatted house in 1938 in Edinburgh was £420, or about 10s. 5d. per superficial foot. In 1945, the tender cost of the same house was £940 or 23s. per superficial foot. Although this increase would be largely accounted for by rises in the price of building materials (the index stood at 205.2 (1930=100) in August 1947), lower productivity per man-hour would also be an important factor. The Committee estimated that there had been a general decrease in output of at least 50 per cent, and gave the following details:-

Trade	Pre-War	1947
Bricklaying	700 bricks per man per day	300 bricks per man per day
Joiner work	Two men, one week per house	Two men, three weeks per house
Plumber work	One man and one apprentice, one and a half weeks per house.	One man and one apprentice, three weeks per house.
Slater work.	25-30 yards per day	20-25 yards per day.

The Committee, in view of this decline in productivity, favoured the introduction of a suitable system of payment-by-results.

Home Counties
Comparison.

A large building contractor working in the Home Counties recently reported⁽¹⁾ an illuminating experiment

(1) "Economist" 10th. January 1948 (these figures were prepared before the introduction of payment-by-results into peace-time building).

which he had made into pre-war and post-war productivity. The comparison was made on two similar housing schemes in the same town, built by the same contractor, the one being completed in 1936, and the other commenced at the end of 1945 and completed in 1947. The houses were of similar specification, except that the pre-war houses had an average floor area of 799 square feet, and the post-war scheme an average of 837 square feet. The average house in the 1936 scheme was finished in 1661 man-hours, whilst the post-war houses took 2795 man-hours. Allowing for the greater floor area, the post-war houses took approximately 50 per cent more man-hours, representing a fall in productivity of 33 per cent.

The Need for
Incentives.

The very apparent fall in productivity in the building trade, and the urgent need for houses gave rise to much public discussion of the problem. A growing feeling developed that since the principle of payment-by-results had been adopted owing to the exigencies of the war-time emergency, it ought to be extended into the post-war situation in order to help meet the equally urgent housing emergency. The building unions argued that the industry had too many ramifications, and that conditions varied too widely in different districts for a bonus system to operate without considerable friction, but many private builders were finding unofficial bonus schemes successful in increasing output. It was

noticeable that private workers were working more efficiently than those employed directly by local authorities, due in many cases to the fact that incentive schemes were in operation despite the Government and trade union ban.

Government
Peace-time
Scheme.

On the 19th. June, 1947, Mr. Durbin, Parliamentary Secretary to the Ministry of Works, announced the Government's intention to revise that section of Regulation 56AB which forbade the payment of incentive bonuses to building operatives. This was followed by a proposal from the Ministry of Labour for an increase of 3d. per hour in the minimum wage, and for the introduction of an incentive scheme to provide an increase in earnings to a level of 20 per cent above time-rate. In the building industry itself there was established an Incentives Committee to review the position with regard to payment-by-results, and eventually the trade union leaders agreed to recommend to their members the acceptance of the Government proposals. A ballot of the 600,000 members of the eighteen trade unions affiliated to the National Federation of Building Trade Operatives was conducted during September, and a majority proved to be in favour of payment-by-results. Following this ballot, the National Joint Council for the Building Industry approved the Government proposals on the 20th. October, and the long controversy came to an end. The national agreement provided for an increase in time wages of 3d. per hour, and piece-rates which would enable the average worker to earn 20 per cent above his

normal day rate. The actual details of the target figures and bonus rates are left to individual agreement between employers and workers, an inevitable liberty in such a diverse and localised industry, but a central record of these local agreements is kept, and there is machinery for the settlement of any disputes which may arise.

As the agreement only came into force on 16th. November, 1947 it is too early yet to pass any considered judgment on its working. The scheme is definitely experimental and will be reviewed in two years' time. The fact that the "pill" of payment-by-results has had to be "sugar-coated" in the form of a substantial increase in time-rates, will mean that the scheme will add greatly to costs unless there is a considerable increase in productivity. However, the dual fact that a workable scheme was evolved during the war, and has been adapted also to peace-time needs, shews that payment-by-results is not only applicable to industries where operations are repetitive and standardised, but also to an industry which, because of its diversity and lack of standardisation, has traditionally been regarded as the exclusive province of the time-rate system.

It was reported⁽¹⁾ that the results of the first fortnight's working of the incentive scheme shewed on a

(1) "News-Chronicle" 10th. December, 1947.

rough average an increase of 20 per cent in output. Leading employers who gave these figures said that the scheme had had a good response and had encouraged a better team-spirit among the operatives. After a period of six months or so has elapsed it will be interesting to have some factual information regarding the effect upon production of the incentive plan, in order that a considered judgment may be given upon its working. This information is likely to be forthcoming as the result of a survey being undertaken by the Building Employers' Federation. A questionnaire is being sent to every employer and the Federation hopes to make a full report in June 1948. Five months after the introduction of the incentive scheme, only about 10 per cent of employers had put it into operation, but the number was steadily increasing. Some employers had hesitated to introduce payment-by-results because of uncertainty about the future of the industry arising from the Government announcement of cuts in capital expenditure.

THE TRADE UNION ATTITUDE TO PAYMENT-BY-RESULTS.Traditional Attitude.

The traditional attitude of the trade unions towards payment-by-results has been one of hostility, for the element of differentiation between workers which it involves is a departure from the union principle of uniformity and solidarity. In 1843, the Journeymen, Steam Engine Machine Makers and Millwrights' Friendly Society, which in 1851 became the Amalgamated Society of Engineers, recommended "to every branch to oppose by every legal means in their power systematic overtime and piece-work. They consider them very injurious to the trade." The attitude of the engineering unions may be taken as being fairly typical of that of the other unions also, and the gradual development of the attitude of organised labour generally, can be traced very clearly in that industry.

By 1889, although piece-work was regarded as an evil, its inroads into industrial practice had had to be recognised even by the official trade union rules. Those of the Steam Engine Makers' Society, for example, stated: "The principle of piece-work as applied at the present time is an evil to the workman and the trade in general. No member of this Society shall seek to introduce it in firms where it has not been already worked or adopted, nor assist in making it general in firms where it is already in operation in single departments. Members violating this rule or principle will be dealt with as acting contrary to

the trade."

The rules of 1892 of the Amalgamated Society of Engineers (now part of the Amalgamated Engineering Union) were even more categorical in their denunciation of piece-work: "Any member asking for or taking work by contract or piece-work in any firm or factory where piece or contract work does not at present exist.....shall, for the first offence be fined twenty shillings, for the second forty shillings, and for the third be expelled from the Society." This did not mean that members could not under any circumstances work piece-work, but only that they must not do so without the approval of the district committee of the Society.

Adopted in 1920 and still in force, the current rules of the Amalgamated Engineering Union state: "No member shall ask for or take work by any system of payment-by-results or contract in any firm or factory where such system of payment does not exist, without the approval of, and in conformity with, the conditions laid down by the district committees."

Hostility
Modified.

During recent decades the bitter resistance of the unions to piece-work has gradually given place to an attempt to introduce into collective bargains various safeguards designed to protect the worker against the dangers - from his point of view - of the piece-work system. One of these safeguards is the "Manchester

guarantee", so called because it was in that city that the practice originated of guaranteeing that the worker shall not receive less than the basic time-wage for the period worked, whatever his output may be. In this way the worker is assured that he will not receive less than the standard trade union rate of pay for the time spent in the factory, irrespective of his output during that time. For example, in the engineering industry both the trade unions and the employers' federations agree that "in all cases the time rate (i.e. the basic rate and the national bonus for time-workers) of the worker concerned shall be guaranteed irrespective of earnings." (1)

This view has been endorsed by the National Arbitration Tribunal, following a claim by the Engineering Joint Trades Movement. (2)

A further safeguard that is widely adopted is a provision whereby the worker of average ability is assured of earning a certain percentage over time wages, usually something between ten and thirty-three per cent. For example, Industrial Court Award Number 728, of the 8th. July, 1922, applying to employees in railway workshops, provides, inter alia, that: "all prices, whether existing at the date of the coming into operation of this Decision.. or new prices, shall be such as to yield to the normal worker not less than 33-1/3rd. per cent. on the worker's time or day rate (excluding war wage or bonus)."

(1) Engineering & Allied Employers' London and District Association "Handbook of Information" (Eighth Edition) December 1947. p. 55.

(2) Award No. 470, dated 2nd. December 1943.

Similarly the agreement⁽¹⁾ which has operated since 1931 in the engineering industry states: "Piece-work prices and bonus or basis times shall be such as will enable a workman of average ability to earn at least 25⁽²⁾ per cent over time rates, excluding War Bonus". This same agreement, which is discussed in greater detail in a later section, illustrates another safeguard which is frequently found in modern practice, namely a guarantee against rate-cutting, except where there has been a mistake in calculation or where materials, means or methods of production, or the quantities have changed, or where the alteration is mutually arranged between the two sides. This safeguard eliminates one of the major evils of the piece-work system, for rate-cutting has always been one of the most fruitful sources of friction wherever payment-by-results has been introduced. Those systems, such as the Rowan, Halsey, Emerson and Bedaux⁽³⁾ which automatically cut the rate as the output is increased beyond a certain point, are still opposed, as a general rule, by the trade unions. "It is largely because the workers feel that they are not receiving the whole of the fruits of

(1) Memorandum of Agreement between the Engineering and Allied Employers' National Federation and the Engineering Joint Trades Movement - 23rd. June, 1931.

(2) Increased to 27½ per cent by National Arbitration Tribunal Decision of March 1943.

(3) Vide post.

their increased effort that these systems are opposed, and, in addition, it is often impossible, owing to the complicated calculations necessary, for the workers to check the amount of bonus due to them. Over and above all this is the feeling that the human element is being mechanised; that pride of craftsmanship, quality of work, and even health and comfort, are being sacrificed to speed of production."⁽¹⁾ For these reasons, the unions have opposed these premium bonus and American-type systems of payment, and have preferred straight piece-rates wherever payment-by-results has been accepted at all.

Effects of
War.

During the Second World War, opposition to piece-work was largely eliminated, and in 1943 at their Annual Meeting the National Committee of the Amalgamated Engineering Union resolved "that the new stage reached in the war makes it imperative that production in the vital war industries must be intensified to ensure the final defeat of the Axis powers. We therefore instruct the Executive Council to meet the appropriate authorities and place before them.....the extension of systems of payment by results and the Government guarantee that rates will not be cut where earnings are increased through greater output". In the same year it was reported⁽²⁾ that the American trade unions were modifying their attitude to payment-by-results. Formerly hostile, they

(1) "The T.U.C. Examines the Bedaux System of Payment-by-Results", published by the T.U.C. General Council under Ref. No. 3B/6/1933.

(2) Magazine "Fortune" September 1943.

now regarded the system as inevitable or even, in some cases, desirable. Two reasons were suggested; first that the unions now felt they were strong enough to prevent abuses, and second that representatives of labour were commonly being invited to take part in the administration of payment-by-results schemes.

Present
Attitude.

Although these changes in attitude were no doubt largely prompted by the urgent needs of the war situation, many of the more responsible trade unionists have realised that the present peace-time needs are hardly less desperate. For example, at the Trades Union Congress at Brighton in October, 1946, the outgoing chairman, Mr. (now Lord) Dukes, urged the abandonment of restrictive practices and opposition to piece-work systems and techniques of scientific management such as time and motion study.

Those indefatigable investigators, the Webbs, sought to portray statistically the attitude of the trade unions to payment-by-results, in their standard work published in 1897⁽¹⁾. Their survey excluded the transport and general labour unions, but of the rest they found 42 trade unions, with a membership of approximately 573,000 which insisted upon piece-work; 38 unions with a total of 290,000 members which insisted upon time-work, and 24 unions with a membership of 140,000 which were prepared to accept both methods of payment. An accurate estimate of a comparable nature

(1) "Industrial Democracy" pp. 286-7.

would not be practicable today, for the process of amalgamation which has gone on in the union movement since the last century has meant that nowadays a great variety of workers are members of the same union, and the vast majority of unions now include both time- and piece-workers.

From enquiries made of the principal unions in each industry, it seems that the official attitude today towards payment-by-results is generally favourable. Only two of the unions included in the survey definitely forbid piece-work in any form, the Amalgamated Society of Woodworkers, Electrical Trades Union and the Electrical Trades Union, and both bodies relaxed their prohibitions during the war. It was agreed⁽¹⁾ to allow payment-by-results on electrical work in the ship-building and ship-repairing industry for the period of the war, the method to be that of group contract schemes and not schemes of individual piece-work.

(1) Agreement between the Shipbuilding Employers' Federation and the Electrical Trades Union, of 11th. February, 1943.

At a recent conference the Electrical Trades Union decided to give its executive council permissive powers to introduce systems of payment-by-results, after consultation with sections of the membership concerned and provided there were trade union consultations at all levels in any systems agreed to.

Analganated
Society of
Woodworkers.

Rule 31 of the Analganated Society of, Woodworkers renders liable to a fine of not more than three pounds, or expulsion from the Society, any member who "is or has been working on a co-partnership system, or any system of premium bonus or payment-by-results, except when working in aircraft establishments or H.M. Dockyards when they shall be allowed to work the system applying thereto"(1)

The war-time relaxation of the rule forbidding piece-work led to keen discussion within the union with regard to the merits and demerits of time-work and piece-work. A series of conferences was held during 1945, and although traditionally the union had insisted on time-rates, it was felt that present circumstances and future developments made it imperative that this attitude be reviewed.

Individual piece-work was not acceptable, and "consolidation of the present basic time-rate with a guaranteed plus production percentage, was agreed as the only acceptable alteration to the system at present in operation".(2)
 Accordingly it was agreed that as from 11th. June 1946 collective piece-work systems could be worked by members employed in the shipbuilding and shiprepairing industry.

- (1) As amended on 1st. July, 1940.
- (2) Report of Twelve Meetings with Management Committees convened by the National Executive Council of the A.S.W. 1945. p.5.

Building
Trades.

The position in the building industry has been fully discussed in a previous section. The National Federation of Building Trades Operatives, the largest labour group in the industry, has traditionally insisted upon the wages of building trades operatives being based on the time-rate system. The rules of the Federation and of its constituents specifically prohibited any kind of piece-work or bonus system. However, following on the experience of the compulsory system of payment-by-results during the Second World War, negotiations were instituted with the Employers' Federation, and in October 1947 it was decided that: "Notwithstanding any existing restrictions (regional, local or sectional) any employer may, in respect of work on a particular site, job, shop or factory, initiate an incentive system of bonus payments proportionate to the results achieved in performing a definite task, allotted either to an individual worker or to a gang of workers or to a team comprising all the men working on that site, on the basis of giving an operative of average ability and capacity a reasonable opportunity to achieve on such work earnings 20 per cent higher than those yielded by the normal prescribed rate." (1)

Railway
Transport.

Even though piece-work has been practised in railway workshops for a very long time, the general attitude of

(1) Summary of Settlement regarding Incentives and Wages etc. of 20th. October, 1947; National Joint Council for the Building Industry.

the largest railway union - the National Union of Railwaymen - was, before the recent War, hostile to the introduction of piece-work or bonus schemes. This attitude was, however, modified during the war years, with the urgent need for increased production in railway work, and there has been a considerable increase in the number of workers in railway workshops covered by payment-by-results schemes. Recently the National Union of Railwaymen concluded an agreement with the London Passenger Transport Board, providing for the introduction of incentive bonus schemes in respect of their workshop staff. The massive Transport and General Workers' Union, with its membership of nearly a million, (1) strongly favours the principle of payment-by-results.

Metal
Trades.

Reference has already been made to the position taken up by the Amalgamated Engineering Union with regard to piece-work. The United Society of Boilermakers and Iron and Steel shipbuilders favours the straight piece-work system rather than premium bonus schemes. It has succeeded in negotiating district and yard piece-work price lists for such trades as rivetting, plating, caulking and welding, whilst in engineering there are lists negotiated within the shop between the men and the management.

(1) Membership: Males 815,675; Females 159,090; Total 974,765 (per Statistical Statement of 78th. Annual Congress of the T.U.C., 1946.)

Speaking at a Conference⁽¹⁾ in 1947, Mr. J. Gardner, Secretary of the Amalgamated Union of Foundry Workers, indicated the attitude of his union to payment-by-results when he said: We are of the opinion greater encouragement can be given to the acceptance of payment-by-results..... You will, I am sure, appreciate how far we have travelled when the foundry trade unions express a readiness to get down to a consideration of payment-by-results as an accepted principle in foundry employment. It is an indication^{low} of our desire and intention to explore every avenue for a solution to our difficulties." The determination of this trade union to extend the principle of payment-by-results was evidenced at the 1947 Annual Delegate Meeting. In his report the General Secretary said: "There is also need for proper incentives being given, particularly in such industries as our own, where unpleasant conditions and hard toil are a prevailing feature.....With regard to the earnings of loose pattern moulders, conference delegates will be asked to consider a memorandum which will establish the principle of payment-by-results throughout the industry. Since 80 per cent of our members are already employed on payment-by-results, this is in itself a mandate which your

(1) Statement presented on behalf of the Foundry Committee of the Confederation of Shipbuilding and Engineering Trade Unions at a Conference with the Engineering and Allied Employers National Federation held on 8th. January, 1947.

Council cannot overlook." This point of view was apparently shared by the meeting, for the following resolution was passed: "Conference agrees that payment-by-results should be introduced wherever possible." (1)

Textile Industry.

The cotton industry has been dealt with in some detail in a previous chapter, and the textile trade unions are, generally, favourably disposed towards payment-by-results, which is the accepted method in most trades. In cotton spinning, the Amalgamated Association of Operative Cotton Spinners and Twiners, and in cotton weaving the Amalgamated Weavers' Association, both favour piecework. As far as the woollen industry is concerned, the National Union of Dyers, Bleachers and Textile Workers supports the system of collective piece-work, and is strong in its advocacy of that method of wage payment. The tailoring industry is covered by Wages Councils' machinery, and the National Union of Tailors and Garment Workers admits both the time and piece-work systems.

Summary.

It will be seen from this survey that official trade union opinion has been swinging away from the traditional attitude of hostility to payment-by-results, and now tends to accept the system as inevitable, and even in some cases, desirable. It is probable that the attitude of the rank-

(1) Resolution passed by the Annual Delegate Meeting of the Amalgamated Union of Foundry Workers, June, 1947.

and-file membership of the unions is less advanced than that of its leaders on this issue. The results of a recent Gallup Poll⁽¹⁾ are illuminating: in reply to the question "Do you agree, or disagree, that production must go up before wages can be increased?" the following answers were given:-

	Agree %	Disagree %	Don't know %
Trades Union Members	67	25	8
Non-Trades Union Members	69	18	13
Total	69	20	11

The second question: "Do you agree, or disagree, that piece-work is likely to increase production?" gave these results:-

	Agree %	Disagree %	Don't know %
Trades Union Members	62	27	11
Non-Trades Union Members	68	17	15
Total	66	20	14

Finally, it was asked, "Do you approve, or disapprove, of piece-work?" and the following are the replies:-

(1) Survey No. 143A, conducted in February 1947 by the British Institute of Public Opinion.

	Approve %	Disapprove %	Qualified %	Don't know %
Trades Union Members	45	38	7	10
Non-Trades Union Members	52	27	7	14
Total	50	30	7	13

Thus it would seem from these results that whereas two-thirds of the population are of the opinion that piece-work is likely to increase production, only half the population are prepared to give it their approval. Trade unionists are stronger in their disapproval than non-trade unionists, and fewer of them agree that piece-work is successful in increasing production. This restrictionist attitude of mind is, unfortunately, only too apparent in industry today, and it involves a psychological disincentive which is striking at the very heart of the British economy. It derives quite naturally from the hitherto understandable struggle of labour to prevent its exploitation by unscrupulous employers, and to secure for itself a greater measure of economic security. A Government committee,⁽¹⁾ reporting after the First World War found "that cases have occurred wherein should the men

(1) Report of the Departmental Committee appointed by the Board of Trade in 1916 to consider the position of the Engineering Trades after the War, This Committee received evidence from thirty-one different branches of the industry, and completed its Report in 1917.

earn more than time and a third they have been fined by their Union", and this 'go-slow' policy is by no means unknown today. Fear of unemployment has made workers adopt almost a 'Luddite' policy towards technical advances, and the following resolution was carried by a large majority at a recent trade union National Committee: "That this National Committee requests that Executive Council should oppose the use of the stop-watch for the fixing of piece-work prices or times on all occasions." (1) This restrictionist attitude of mind, understandable enough in past decades of exploitation, has come to be identified among many workers with progress, with the result that a keen, energetic workman cannot give of his best without incurring the disapproval of his mates. Official trade union policy has succeeded in abandoning many of the traditional restrictionist practices, but they still exert a powerful influence upon the minds of the individual workers, and until they can be effectively removed, the economic recovery of this country will remain but a transient dream.

(1) Twenty-Ninth National Committee of the Amalgamated Engineering Union, June 1947. Resolution carried by 41 votes to 6, with 3 neutral.

CHAPTER X.
THE INDIVIDUAL PIECE-WORK SYSTEM.

We have now to consider the various systems of payment-by-results which are found in this country. The simplest of these is that known as "piece-work", where the employer does not pay so much per hour, but so much per piece, that is per unit of production. Clearly this system is most easily applicable to work of a repetitive nature, performed in more or less standardised conditions, so that a given amount of energy and skill can be relied upon to produce a given output. The output must be measurable, in terms of tons, yards, numbers, or some other unit, so that the system is not suited to agricultural and clerical work, executive and administrative duties, where output cannot easily be computed. In shipbuilding, for example, riveters, platers, caulkers, drillers and burners are normally paid on piece-work when working on new ships, but this method of payment is not applicable to these trades when performing ship repair work. This means that these men have to be paid a "lieu-rate" to give them an increase over their basic time-wage; otherwise they would not be willing to undertake repair work.

Emphasis
on Quantity.

As a piece-worker's earnings vary directly with the number of units produced, for each of which the same payment is made, this encourages him to produce as many units as possible, and the emphasis is upon quantity rather than

quality of output. Thus, piece-work is most successful where quantity of output is the prime consideration, and where inspection for quality is easily effected. It is not suited to processes in which waste resulting from increased speed of working would exceed the gain resulting from the extra output. In such cases many employers only pay for work which passes certain tests, but even if this precaution is taken, the waste remains.

Again, piece-work cannot properly fulfil its function in cases where the number of units of output produced is not under the worker's control, but is determined by the speed of the machine which he is tending, or the particular process in which he is engaged. In the Ford motor works, for example, production is almost entirely determined by the speed of machinery and conveyor belts, and since output is outside the worker's control, the piece-work system is not applied. In the oil refining industry, where the thermal and chemical processes are under close technical control as regards both quality and quantity of output, the piece-work system is not generally in use in Great Britain, or the East, or the United States of America. Point premium systems have not been markedly successful either in this and similar intricate chemical processes. The volume of oil processed is maintained at the maximum throughout for which the particular equipment is specifically designed, the target being set and the output controlled by the technical staffs.

Advantages. The great advantage of the straight piece-work system is that it gives the greatest possible incentive to increased output, since the workers receive all the benefit of the time which they save - it is sometimes called a 100 per cent premium, or a 100 per cent sharing plan, although in fact there is no sharing involved. From the employer's point of view, therefore, increased output does not give him falling wages costs per unit of output - labour cost per unit is a constant - but the larger output does enable overhead costs to be spread over a large number of units of output, so that total costs per unit are reduced. The premium-bonus schemes and complicated sharing plans are designed to give falling labour-cost per unit of output as output rises, in addition to falling overhead costs per unit, but as this necessarily involves a constantly diminishing piece-work price, these systems have not the same incentive power that the straight piece-work method possesses.

The firms included in the present survey were asked to estimate the increase in output which had resulted from the introduction of the piece-work system, but accurate data proved difficult to secure. A number of firms had used the piece-work system for so long that they could not make any estimate; others had not the necessary data upon which to base an estimate, but reported that there was undoubtedly a definite increase. Those firms which did make an estimate put the increase at varying figures up to 33-1/3rd. per cent. The average experience seems to be that output is increased by anything

from a quarter to a third when piece-work is introduced in place of day work. American experience agrees with this estimate; one report⁽¹⁾ stated that the changeover should give an average of 30 per cent. increase in output, and a 25 per cent increase in wages; another survey⁽²⁾ of 659 plants in the United States shewed that workers on incentive schemes received 10.3 to 18.2 per cent more per hour than those on time-payment. (This second estimate of wage increases would be lower than the first because it included many incentive schemes other than piece-work, in which the time saved was shared between employer and employee).

Case 1.

Three outstanding cases of increased output following the introduction of piece-work may be mentioned. One firm included in the present survey was one specialising in the manufacture of sweet confectionery. During the War another firm manufacturing a special kind of biscuit had its plant heavily bombed, and of the eight machine-units which it employed, only four could be salvaged. These were removed to the chocolate manufacturing firm's premises, and were set to work manufacturing biscuits for the bombed-out owners. Previously, manufacture had been on a daywork system, but the chocolate firm were accustomed to piece-work practice, and they put the biscuit operatives on the same system, basing their piece-work prices on the previous experience of

(1) National Industrial Conference Board (U.S.A.) Report 1930.
 (2) Bureau of Labor Statistics Survey (U.S.A.) 1943.

the biscuit manufacturers working on a time-rate system. After a time, the output increased so much under the stimulus of the wage incentive that the four productive units were producing more than had previously been produced by the eight original units.

Case 2.

Another case of outstanding interest was that of a firm whose peace-time production consisted of soft furnishings such as down quilts, bedspreads, cushions, curtains, etc. During the War, the firm turned over to the manufacture of parachutes and anti-torpedo nets amongst other things. In the early stages, until they were able to ascertain the proper times for each operation, the firm paid the operatives on a time-rate basis, and production was very low, partly due no doubt to the inexperience of both operatives and management, but - in the opinion of the manager - mainly due to the absence of any real financial incentive. Business efficiency experts were called in and they advised long conveyor belts being installed for the parachute work. This was done, and the Ministry of Aircraft Production considered that good progress was being made, and were satisfied with both the production and the price charged. It was clear to the management, however, that the belts could be speeded up without any strain being put upon the girls. A committee of girls from each belt was formed, and a system worked out whereby a bonus was paid to every girl on the belt whenever the committee considered that the speed of the belt could be increased

to save a minute. One minute only was saved by this method. Various meetings were held with the committees, but they were emphatic that the main body of the girls would not be able to keep up with the belt if it was speeded up further. Efforts were made to eliminate the slower workers by providing them with alternative work off the belt, but still production lagged, although it was clear to the management that many of the workers were capable of speedier work. Finally, the management posted up a notice to the effect that as from the beginning of the next pay week, the belts would cease working and a piece-work system be installed, prices being based on existing production and rates of pay. The increase in output at the end of the following week was amazing. Production went up by 57 per cent, and this increase later rose to 73 per cent, and was maintained at that figure. Absenteeism, which had hitherto proved a great problem necessitating a large number of spare operatives being kept on hand to replace the absentees, dwindled to very small proportions. Time-keeping had always been a difficulty, workers coming on duty anything up to half-an-hour late, but now many of the employees were found waiting to make a start a quarter of an hour before starting time, and getting quite annoyed if the mechanics were not ready to start the machines and let them get to work at once!

Case 3.

The third case was that of a textile firm which was asked by the Admiralty as a war-time measure to manufacture

anti-torpedo nets. The work, which was performed by female workers, consisted of taking a 21 foot length of 12 gauge wire and making a circular grommet with it by twisting it round and round itself, finally burying the ends into the centre of the strands. Each grommet was interlaced through those already made on the frame, so that the final steel net, weighing about $2\frac{1}{2}$ tons, ~~was~~ built up in rows and measured 75 feet by 40 feet when finished. The manager of the firm visited well-known rope-makers in other parts of the country in order to obtain times for the various jobs, and to see their plant layout. At first the workers were paid on a daywork basis, and the average rate of production per pair of workers was 800 per week. It was felt that this was inadequate and a piece-work system was introduced, with the result that output jumped to nearly 2,000 per week for each pair of workers, an increase of nearly 150 per cent.

I.H.R.B.
Experiments.

The results of an investigation⁽¹⁾ carried out by Messrs. Wyatt, Frost and Stock are apposite to this question of the incentive power of the straight piece-work system. The experiment was conducted on a small group of girl operatives employed on the wrapping, packing and weighing of toffee - all repetitive jobs. The workers were first paid a fixed weekly wage for a period

(1) Industrial Health Research Board Report No. 69: "Incentives in Repetitive Work" by S. Wyatt, L. Frost & F.G.L. Stock. (H.M.S.O. 1934).

of nine weeks, and this was followed by a competitive bonus system for a further period of fifteen weeks. During this time, the girls were ranked according to output, the slowest worker being given the same wage as before, the next being given an additional sixpence, and so on throughout the group. This bonus system was followed by a flat piece-rate which continued in operation for twelve weeks, making a total of thirty-six weeks for the whole experiment. The results were as follows: "The amount of improvement during the time-rate period was relatively small (12 per cent) and there were indications that a continuation of this method of payment would have resulted in no appreciable increase in output. It was for this reason that the bonus scheme was introduced, and the immediate effect was an increase in output of 46 per cent. The curve of output continued to rise for the greater part of this period, but towards the end it remained at a fairly uniform level, and a further change in the method of payment seemed desirable. The flat piece-rate was accordingly introduced, and again there was a notable increase in output (30 per cent) which, after a temporary reaction, was maintained with very little change." (1)

Other effects of Piece-work. Other factors in addition to the direct financial incentive tend to increase output under piece-work.

(1) Ibid pp. 4-5.

Besides doing their work more quickly, workers will be anxious to ensure a steady flow of materials and partly finished goods, and will keep their machines in better working order, taking less time over minor repairs and adjustments, in order to make their bonus as large as possible. This is one of the principal advantages of piece-work in the cotton spinning industry, where to a large extent the operative's speed of working is determined by the speed of the machinery, but where a great deal of time can be wasted over thread breakages and minor mechanical difficulties. Payment on a piece-work basis ensures that this lost time will be minimised. The worker's interest is aroused in the general organisation of the shop, and in the efficiency of the ancillary workers, and this tends to promote a higher degree of overall efficiency.

In short, under piece-work, the worker acts to a considerable extent as his own supervisor, since his earnings vary directly with the amount of work which he performs. Thus, the costs of supervision are substantially reduced, although the costs of quality control and inspection may have to be raised in order to maintain the required standards of quality. This tendency for piece-workers to act as their own supervisors was well illustrated in the Industrial Health Research Board study.⁽¹⁾

(1) Ibid pp. 20-21.

already referred to. The following figures shew the average number of times per week when one worker acted in a manner which disturbed or distracted the majority of the others:-

Time-rate: 20.1 Bonus-rate: 16.6 Piece-rate: 11.3

It was noticeable that when they were paid by time, the workers wasted each other's time by talking and frivolous behaviour, whereas under the piece-work system their anxiety to earn bonus curbed this tendency. The relative amount of talking under the different methods of payment was found to be:-

Time-rate: 1.00 Bonus-rate: 0.79 Piece-rate: 0.71

Simplicity.

One great advantage which the straight piece-work system has over the other methods of payment-by-results is its simplicity. Both for the worker and for the pay-clerk it is a matter of simple arithmetic to calculate the piece-work bonus and this is a powerful factor in favour of piece-work from both employer's and employee's point of view. It seems that the outlook of the British working man is fundamentally different from that of his American cousin, and this is the rock upon which so many of the American wage-incentive systems have foundered. Very frequently these are highly complicated, and the average workman cannot calculate how his wages have been computed. Even where time-cards are given to the workers to explain how the wage-packet has been made up, these are often

unintelligible to the ordinary worker.

This element of simplicity in the straight piece-work system is also an advantage to the employer, for it reduces the costs of administering the wage plan.

Although the firms included in the survey found it difficult if not impossible to tabulate the comparative costs of administering the various wage-systems which they employed, it was noticeable that, apart from day-work, the piece-work system was the least costly of the various payment-by-results methods. Apart from the question of costs of administration, the piece-work times and prices are an invaluable aid to cost-accounting and production control. It is very much easier to estimate the labour-cost involved in the manufacture of a certain article if that article is produced by piece-workers than if it is produced by time-workers. From the point of view of production control, the fact that output has to be regularly measured for piece-work payment purposes, makes very much easier the work of management in maintaining a check on the efficiency of the various sections of the plant.

The advantages of the straight piece-work system may be summed up in the words of the Superintendent of a large engineering firm on Clydeside:- "I prefer straight piece-work to the other systems, although I am aware that some employers have operated these systems successfully..

Under the traditional method of piece-work

Seventy-five per cent of my workers were highly skilled engineers - all trade unionists - with a sprinkling of other tradesmen, semi-skilled workmen and labourers. Immediately on my appointment I put into practice the system (piece-work) and had as reward thirty years of absolutely trouble-free experience on all wage problems. Throughout that time I never had an argument with a shop steward, nor a single deputation of workers to my office to discuss wages questions. My opinion of my staff of workers was that they were the finest group of workmen on Clydeside or any other side!"

Disadvantages of piece-work. It must, however, be admitted that all the evidence is not in favour of piece-work, for even under ideal conditions of work the system suffers from considerable disadvantages. The most difficult problem involved in the administration of a piece-work system is that of rate-fixing, and this is such an important matter that it will be discussed in some detail in the next chapter. In the matter of rate-fixing, the points of view of management and workers are inevitably conflicting, the former wishing to keep labour costs per unit as low as possible, and the latter wishing to maximise earnings, and this conflict of interest may easily lead to ill-feeling. Even if there is a guarantee given by the employer that rates will not be cut, employees may still limit their output since they fear that when new rates have to be set, these new rates will be "tighter". Under the traditional method of fixing piece-work prices,

that is, on the basis of past experience, some rates will inevitably be "loose" and some "tight", that is, some will be over generous to the worker, and others rather niggardly. Workers will naturally press for a relaxation of the latter, but, owing to the rate-cutting guarantee, the employer will not be able to reduce the former, so that there is a continual tendency for the average to be "loose". This means that labour costs are unduly high, and the employer's competitive position in the market is prejudiced.

Wage-changes. A further disadvantage of the piece-work system is that, in the event - in these days quite frequent - of a new wage agreement being reached between employers' organisations and the trade unions, involving a change in time-rates of pay, this means that all the individual piece-work prices in the plant will have to be adjusted, a terrific task in a large manufactory. For this reason, many manufacturers quote piece-work prices on a time basis rather than a cash basis, so that when basic time-rates are altered this does not involve the readjustment of the whole piece-work schedule. This practice is frequently adopted in the engineering industry. In iron-founding, pattern-makers have traditionally been time-workers, but recently payment-by-results has been extended to this trade, piece-work prices being expressed in terms of hours rather than monetary units.

Standard Times
System.

Fully developed, this method of stating piece-work prices in terms of time, is known as the "standard times

system". (1) There is need for strict accuracy in fixing task times, for if times are loose then unduly high bonuses will result, giving higher costs and lower efficiency than the optimum. If operators find that they can make adequate bonus easily, they will not trouble to exert themselves further. On the other hand the rate-fixer must not try to make rates too tight, or dissatisfaction and ill-feeling will inevitably follow. Traditional rate-fixing methods are inadequate for this system; time-study must be employed to forecast accurately the time required to perform the task. Each job is then given a standard time for its performance, and the employee is paid so much per standard hour of work done, irrespective of the actual time taken. For example, if the standard time is four hours, and the worker does the job in three, he has saved one hour, and this is paid to him as a bonus - for that job he receives a total payment of four hours at his own time-rate. From the employee's point of view, the financial result is exactly the same as if the work was paid for by the piece, and the worker gets the full benefit of any saving he makes; he can earn unlimited bonus, and this tends to make a strong incentive. To the employer, however, the advantages over the ordinary piece-work system are obviously considerable. One has already been mentioned, namely the ease with which changes in time-rates can be put

(1) This use of the term "standard times" must not be confused with the Westinghouse incentive plan of American practice.

although it may not be strict into effect. Furthermore, production control is simplified, for all jobs, irrespective of the wage-level of the operative required for each, are computed in terms of a time unit, thus facilitating comparisons between the various jobs involved. This comparison is the more real because job values are divorced from differences in wage levels.

Constant
Labour-cost
per unit

The employer regards it as a disadvantage of the piece-work system that, since the same amount is paid for each unit produced, labour-cost per unit is a constant. This complaint is the "raison d'etre" of the premium-bonus systems, in which the piece-rate automatically falls as output increases, giving a constantly declining labour-cost per unit. The constant labour-cost per unit of the straight piece-work system, however, means that the task of costing a job is very much simplified, as compared with the bonus schemes. It means also that the incentive value of the system is maximised by allowing the worker the full benefit of the time he saves. In short, although it is true that total cost per piece is higher at high productions than under the time-rate system, higher productions are actually achieved under piece-work whereas they are doubtful under daywork. Under piece-work, all the saving in overheads goes to the employer, and all the saving in productive time goes to the employee. This is probably the fairest principle to follow, for establishment charges are outside the worker's province on the one hand, and on the other, the effort of the employee is mainly independent of the management,

although it may not be strictly true (as the piece-work system presupposes) that ceteris paribus output increases in direct proportion to the effort of the workers. Where improvements in methods of production and organisation are introduced, for example, the consequent increase in output has not been due to the effort of the workers, and the benefits of it should not pass to them, unless the new methods mean that they have to work harder. There must be an easy and agreed basis for readjustment of piece-work prices or standard times in such circumstances, otherwise the result is both unfair and uneconomic, and there is no incentive to the employer to increase managerial efficiency. The protagonists of the premium-bonus systems contend that the sharing of the time saved gives this incentive to the employer as well as to the employee, and avoids the necessity for the alteration of bonus times when minor changes in method are made.

Psychological
Disadvantages

Owing to the difficulty of accurate rate-fixing, and also owing to variations in individual workers' capacities, payment on a piece-work basis leads to differences in the earnings of workers doing the same kind of work. This may have a number of undesirable consequences; it may lead to dissatisfaction, quarrels, and complaints. A large English company engaged in the manufacture of electrical equipment found that where the girls working on the same bench received different earnings because of differences in individual output, envy, jealousy and petty bickering became evident.

A changeover to a group system, whereby the output of the girls was pooled and a group bonus paid, resolved the difficulty. In some engineering workshops it was found that where employers paid on an individual piece-work basis, the workers voluntarily organised their own "fellowship" system, whereby the men, when they received their individual pay-packets, pooled their earnings and redistributed the balances on some mutually agreed basis.

In their investigation on incentives, (1) Messrs. Wyatt, Frost and Stock found that quarrels and complaints were more frequent under piece-work than under time-work. The comparative frequency was:-

	<u>Quarrels.</u>	<u>Complaints.</u>
Time-rate.	1.4	2.9
Bonus-rate	6.9	7.1
Piece-rate	4.2	10.8

When payment-by-results was introduced, "some of the workers accused the others of being 'mean' and 'hurrying' and jealousy was shown whenever an unusually high level of output was attained. Abusive and insulting remarks were fairly common and friendships were sometimes strained or broken. Needless to say, the slower and less capable operatives were generally responsible for these incidents....The bonus method of payment revealed unpleasant personal tendencies which had remained dormant under the time-rate and the individuals no longer worked as a harmonious group." Quarrels were less frequent

(1) I.H.R.B. Report No. 69. (supra)

on the piece-work system than on the bonus-payment, but complaints about materials and conditions of work, indeed anything which seemed to interfere with output became more numerous.

Trouble of this kind often arises because of inadequate preparation on the part of the management prior to the introduction of the piece-work system. One Scottish engineer found that in a number of firms with which he was at various times associated difficulties were encountered which were entirely due to the management's having failed to remove all possible hindrances to the successful operation of piece-work before introducing it. Unsatisfactory tools, insufficient supply of material, alterations to drawings and methods, inadequate crane or lifting services for heavy materials, were frequently the cause of trouble, making the worker dissatisfied at finding his earnings curtailed by what he considered - often justly - as the mistakes of management.

Whilst the answer to this particular problem is entirely in the hands of the management, others are not so easily overcome. Owing to the fact that some prices are almost inevitably "loose" and others "tight", workers tend to seek for those jobs which yield high earnings, and shun the others, and complaints of favouritism are frequently forthcoming. These complaints may not be entirely unjustified, for an

unscrupulous foreman will often give the best priced jobs to his favourite workers and force those whom he happens to dislike to perform the less remunerative tasks. This danger is not, however, peculiar to piece-work; on daywork too the foreman can give the hard, dirty and unpleasant jobs to one worker and reserve the pleasanter tasks for the favoured few.

Effect on
Quality.

One of the gravest disadvantages of the piece-work system is that it emphasises quantity at the expense of quality. In his anxiety to earn bonus, the worker may tend to hurry unduly over his work, and produce articles which will only just pass inspection and no more. If there is a high reject rate and materials are expensive, the loss due to wastage may outweigh the gain from increased output. Hence, for really successful working, the piece-work system is most easily applied to operations in which inspection of large quantities can readily be undertaken by someone other than the worker himself, or by some mechanical device.

This is not to say, however, that the piece-work system is not applicable to the maintenance of high standards of quality. A well-known manufacturer of musical instruments of very high quality, uses the piece-work system almost exclusively, since the jobs can be standardised and efficient quality control maintained.

Quality Control.

Modern techniques of quality control ensure that a constant watch is kept on the quality of output throughout the period of production, not merely on its completion. For example, a firm manufacturing in peace-time gramophone motors and clocks, and in war-time engaged in precision engineering, has the following inspection arrangements. There is a Foreman Inspector who is in charge of the personnel who do the actual inspection. Under him are Shop Inspectors, trained for the work, and each in charge of the inspection in a particular department. These Shop Inspectors are responsible for checking the first parts off a new set-up on any machine and under them come female Patrol Viewers, who keep going round the machines checking the work as it is produced.

Their method of quality control is adapted from that suggested by the Ministry of Supply⁽¹⁾ and is really a form of organised sampling, coupled with graphical records. The total product of each machine is divided into a number of sub-groups, either by time intervals (e.g. an hour's production) or by box size, etc. A sample of components is taken from each sub-group, the sample representing about 5 to 10 per cent of the sub group. Thus, if production was at the rate of 150 per hour, and the number in the sample was fixed at five, a sample would be taken every

(1) "A First Guide to Quality Control for Engineers": Ministry of Supply, London, September 1943.
Vide also: "Production and Engineering Bulletin": Ministry of Labour, Vol. 4. No. 29, May, 1945.

30 to 40 minutes, so that the number of components in each sub-group would be 75 to 100. This sample may be taken at random, or the inspector may take the last five components produced; the first gives a more representative sample, but the second indicates more clearly the state of the machine at the time of sampling, and is used where frequent fine adjustment of cut, feed and speed is necessary.

When the sampling has been done, the measurements are taken on each individual component in the sample. It may be a measurement of dimension, weight, pressure, strength, electrical resistance, or anything else which can be measured. These measurements for the several components are added together and the sum divided by the number in the sample, giving the sample mean or average, usually denoted by \bar{x} . Then the smallest individual measurement is subtracted from the largest in the sample, and this gives the sample range, usually denoted by w . The noting of the measurements, and the above calculations are done on the data sheet,⁽¹⁾ which also indicates the relevant data regarding the job, e.g. contract number, drawing number, machine number, dimension, and so on. The sample mean and the sample range are plotted on the control chart⁽²⁾ consisting of squared paper on which details are given of the job and the dimension to be checked. On the chart are ruled two black lines, one

(1) Appendix A(1)

(2) Appendix A(2)

above and one below the dimension that is being worked to on the machine, indicating the tolerance allowed as per the drawing. For example, if the size being aimed at is, say, $\frac{1}{2}$ inch with a tolerance of ± 0.005 inch, then the upper line will be ruled at 0.505 and the lower line at 0.495 inch. Inside these two lines are ruled two more lines, usually in red ink. These are the quality control limits, and are calculated on a formula based on the theory of probability.⁽¹⁾ So long as none of the points plotted on the chart to indicate the sample mean comes outside the control limits, the operation is said to be "in a state of control". If a plotted point does fall outside the control limits, the job is stopped and all the components produced since the last sample was taken are given a 100 per cent inspection. The cause of the error is investigated and, if necessary, the machine adjusted until the job is again coming off the machine satisfactorily, as indicated by the plotted points being within the control limits. If this investigation is carried out each time a "wild" point appears, faults will gradually be detected and corrected until a state is reached in which the points rarely or never fall outside their control limits. This process of adjustment is well illustrated in Appendix A(2).

(1) For method of calculating control limits, vide "First Guide to Quality Control for Engineers" (Ministry of Supply) p. 5.

An important advantage of this method of quality control is the psychological effect on operators and setters, for they have constantly before them on the machine or bench a graphical record of the quality of their work, which helps to keep them up to standard. Most important of all is the continuous nature of the inspection; the work is constantly checked as it comes off the machine, instead of waiting until a lot of parts have been made and then sorting out the good from the bad ~~by~~^{by} a 100 per cent inspection. If some such method as the above is adopted, there is no reason why piece-work should result in an unduly high proportion of rejects.

Quality Bonuses

Some firms have developed these techniques even further, and encourage the maintenance of high standards of quality on piece-work by the introduction of quality bonuses. For example, a firm of rubber manufacturers adopts the straight piece-rate per unit or per 100, with a guaranteed minimum time-rate, and in addition a daily bonus for low scrap-figures, and where a certain "target" output is exceeded.

The actual details of the various schemes of quality bonuses vary widely, but the following may be cited as an example. The industrialist who introduced the scheme felt that a positive incentive was more successful than a negative one; that an additional award offered for high quality of work was more likely to produce consistently good work than a system of penalties only for bad work.

Accordingly he put into use the following over-riding quality incentive⁽¹⁾ in addition to normal piece-work:-

<u>% rejects (either scrap or recoverable) due to bad work by operator</u>	<u>Over-riding quality bonus - pence per hour</u>
0 to 1	1½d. bonus
1.1 to 3	¾d. "
3.1 to 5	½d. "
5.1 to 7	¼d. "
7.1 to 10	Nil
10.1 to 12	¼d. penalty
12.1 to 15	½d. "
15.1 to 20	¾d. "
20.1 to 25	1d. "
25.1 to 35	2d. "
35.1 to 45	3d. "
Over 45%	6d. penalty, or loss of all bonus, if more than 6d.

The bonus is calculated over the aggregate of each day's work, not on each individual job; this makes for the expenditure of a minimum of clerical effort.

To sum up the position with regard to quality under a piece-work system of wage payment: there is no doubt that the emphasis which piece-work places upon quantity must inevitably tend to reduce the sense of craftsmanship of a worker, and may encourage him to produce shoddy work. On the other hand, if the product is one which can be fairly easily inspected in large quantities by someone other than the worker himself or by some mechanical device, the modern techniques of quality control, coupled perhaps with a system of quality bonuses, should be quite adequate to the maintenance of the desired standards.

(1) Illustrated graphically in Appendix "A".⁽⁴⁾

CHAPTER XI.PIECE-WORK: PROBLEMS OF RATE-FIXING.I. RATE-CUTTING.

One of the most difficult problems encountered in the administration of the piece-work system of wage-payment is that of rate-fixing. The traditional method is to base piece-work prices on past experience of operation times, but the previous output on day work is only a very imperfect measure of what will be done under piece-work. The modern techniques of time and motion study are as yet not widely used in this country except in mass-production plants, but there is really no other accurate means of assessing piece-work prices.

Rate-cutting. This problem of accurate rate-fixing leads to another, namely that of rate-cutting, which has, perhaps more than any other one factor, been the cause of failure to operate successfully the piece-work system. If prices fixed by the traditional methods are fixed too high - as they may easily be - the worker earns excessively high wages from the employer's point of view, and so he may be tempted to cut the piece-rate. For example, a Scottish confectionery firm took over the manufacture of an English firm's product when the latter's premises were damaged by enemy action. Piece-work prices were fixed on the past experience of the parent firm working on a day work basis. These prices proved to be so liberal that production went up by leaps and bounds, thus giving the girl operatives unduly high

piece-work bonuses. This caused dissatisfaction among the Scottish firm's staff engaged in the manufacture of that firm's own products, for its piece-work prices had been more accurately fixed by means of time-study. The Labour Manager is in a cleft stick, for he knows that if he cuts the "loose" rates, this will cause trouble with the operatives on those jobs, whereas if he leaves things as they are his own staff will become dissatisfied, and demand increases in their own rates.

Restriction
of Output

Rate-cutting inevitably results in bad industrial relations, and it frustrates the power of piece-work as an incentive to greater output. Indeed, if workers suspect that in the event of their substantially increasing their output piece-rates will be cut, they will restrict their output to a limited amount. Reference has already been made to the "four day week" policy of the Lanarkshire miners in 1914, who deliberately restricted their output for fear of rate-cutting. Deliberate restriction of this kind has sometimes been either imposed or encouraged by the trade unions, for it was reported⁽¹⁾ in 1917 that "cases have occurred wherein should the men earn more than time and a third they have been fined by their union." Again, 'over-booking', that is, earning more than the agreed percentage over time-wage, is sometimes punishable by fine, and those committing the offence for the third time may be

(1) Report of Departmental Committee of the Board of Trade, appointed to consider the position of the Engineering Trades after the War. 1917.

liable to expulsion from the union. Nowadays, however, this "go-slow" policy would not be the official policy of the trade unions, and does not appear to be upheld by any published union rules or regulations. Where it does appear, it is the result of concerted agreement of the men in the shop. There are many trade union rules which do in fact result in restriction of output, but these are not concerned with the specific problem of rate-cutting. For example, there are restrictions on the employment of non-union men, dilution of skilled labour, working of overtime, extension of payment-by-results schemes, employment of certain classes of men on certain machines, and so on.

Falling
Labour-costs

Even where the piece-rate is not unduly "loose", an employer may be tempted to cut the rate due to his desire to secure falling labour-costs per unit as output goes up. Whilst the worker who manages to increase his output naturally contends that he should receive the full benefit of his improved efficiency, the employer may argue that in view of the intense competition against which he has to fight it is imperative that he should achieve lower labour-costs per unit of output. His total costs per unit will fall automatically as output rises, since the burden of overheads will be spread over a larger output, but in order to secure falling wages-costs per unit, piece-rates must be cut. This is the idea behind the premium-bonus systems such as Rowan and Halsey, and the American sharing plans.

Indeed, employers may easily allow the piece-work system to become virtually a time-rate system under a different name. Under a time-wage, the amount which is expected of a man as being a reasonable day's work is usually fairly well defined and understood. Under piece-work the rate is fixed so that an average man working reasonably hard will earn a certain wage; if the rate is cut in the event of his exceeding this level, there is little real difference between the two methods, at least so far as their ultimate results are concerned.

The feeling seems to be quite widely held that if a piece-worker earns 25 to 33 per cent over time wages, that is as much as he can expect. An employer frequently contends that a certain class of worker is "worth" so much a week, and that if the worker by producing a greater output puts his earnings above that recognised level, the piece-rate should be cut. Not unnaturally this extremely short-sighted policy tends to develop a great distrust of the piece-work system on the part of the workers, and the result is that although piece-work is in theory supposed to encourage the maximum output, in fact it only induces the worker to produce a certain limited amount. "If the worker's price is to be cut as fast as he increases his output, he will be more than human if he does not keep down his output to the lowest limit that he can get the employer to accept."⁽¹⁾

(1) Cole: "Payment of Wages" p. 27.

During the Second World War there was no limitation of piece-work earnings owing to the obvious need to avoid any loss of output which might damage the war effort. The Minister of Labour told the House of Commons that this was definitely Government policy; he said: "It was said in a previous debate that I had caused some uneasiness by the statement, which I had made publicly, that I did not mind what was earned on payment-by-results, so long as it represented production. We were asked whether or not that represented Government policy. My answer is: 'Yes, emphatically.' When a rate is fixed through the procedure existing in industry and the people increase their output, it is not our concern, from that point, what they earn. The more the people increase their earnings, the lower they make the cost of production.....and there is greater production for the war effort." (1)

Under war-time conditions, of course, the urge to increase output derived not only from the financial incentive but also from patriotic motives encouraged by Government propaganda. It was said of the days following Dunkirk: "Men fell exhausted at their lathes, and workmen and working women did not take their clothes off for a week at a time. Meals, rest, and relaxation all faded from their minds and they just carried on to the utmost limit of their strength." (2)

(1) Mr. Earnest Bevin, Minister of Labour, speaking to the House of Commons on 29th. July, 1941.

(2) Mr. Winston Churchill, Prime Minister, July, 1941.

Guarantees
against rate-
cutting.

Although the need to avoid restriction of output is much more apparent under the exigencies of war, it is no less important in peace, and especially so in the present economic crisis. More and more employers have come to realise the folly of rate-cutting, and whereas formerly it was practised openly, nowadays few employers of any real standing have recourse to this short-sighted policy.

A Government Committee⁽¹⁾ reporting in 1917 made the following recommendation: "We are of the opinion that a piece-rate once fixed, and proved to be reasonable after fair trial, ought not to be disturbed, except by adjustment through agreed rise and fall of wages or in very special circumstances - such as the introduction of an improved machine or method of producing the same article. Naturally, a piece-rate on a new article cannot be arrived at with any degree of certainty until its production has continued for some time. When the work has once been reduced to a piece-rate, it should not be capable of being disturbed, except by adjustment, without the consent of the local Employers' Association and the Branch of the Trade Union affected."

This recommendation has in many cases been accepted, and in a number of industries where collective agreements have been negotiated these provide guarantees against the possibility of rate cutting. For example, in the

(1) Report of the Departmental Committee of the Board of Trade on the Engineering Trades, 1917.

Agreement⁽¹⁾ covering the wages of railway shopmen, the following clause appears: "No piece-work price..... shall be altered unless the material, means or method of production is changed." In the engineering and allied industries, the position is regulated thus: "No piece-work prices, bonus or basis times once established may be altered except for the following reasons:-

- (1) A mistake in the calculation on either side, or
- (2) The material, means or method of production or the quantities are changed, or
- (3) A mutual arrangement has been come to between the employer and the worker in the same way as a new price is arranged."⁽²⁾

Mistakes in rates.

Agreements such as these should, with reasonable and honest interpretation on both sides, meet the case, but in spite of this difficulties have still been encountered. With regard to mistakes in price-fixing, some workers contend that employers are more ready to discover mistakes when rates are "loose" than when they are "tight". Frequently this difficulty of inaccurate rate-fixing can be to some extent resolved by the workers setting off the loosely-priced jobs against those which are tight, but if

(1) Industrial Court Award No. 728 of 8th. July, 1922. See Appendix "B" (1).

(2) Memorandum of Agreement between the Engineering and Allied Employers' National Federation and the Engineering Joint Trades Movement - 23rd. June, 1931. See Appendix "B" (2)

the employer takes advantage of the clause in the agreement to reduce the ~~low~~ price, and fails to increase the tight price, the worker's level of earning suffers. It is doubtful, however, if this contention could be maintained in the majority of cases, for in organised trades the unions are usually strong enough to press an increase in low prices; indeed the majority of employers contend that on an average prices tend to be loose rather than tight. There are, of course, inevitably two points of view on the matter of what is, and what is not, a "reasonable" price, and the difficult nature of the problem merely serves to emphasise the necessity for accurate rate-fixing at the very outset.

New Jobs.

This is, however, difficult in the case of completely new jobs, for it inevitably takes longer to do a job for the first few times than it does after a rhythm of movement has been achieved. In the case of one agreement⁽¹⁾ this problem has been dealt with thus:-

"The company guarantee that the standard output required to earn standard piece or bonus money will remain unaltered.....and that standard outputs on new jobs (including all existing jobs for which the final rate has not yet been set) will be similarly guaranteed when sufficient time and practice have been allowed for attaining normal skill on the job."

(1) Agreement in operation at the Rowntree Cocoa Works, quoted in Rowntree: "The Human Factor in Business" pp. 51-52. See Appendix "B" (3).

Changes in
Methods

The most frequent cause of dispute in the administration of these rate-cutting guarantees is that of rate reductions arising out of changes in methods. It has been claimed that "parts on which high bonus has been earned have been withdrawn from production and reissued with some minor modification which has not reduced the amount of work to be performed, but has enabled the 'modified' product to be classed as new work, and retimed."⁽¹⁾ The trade unions frequently maintain that methods are changed merely in order to make possible a cutting of rates, or that when a cut follows a genuine change in method, the cut in the rate is quite disproportionate to the reduction in the amount of effort or time required to do the job by the new method.

The numerous and complicated problems involved in the administration of a piece-work system - or any other wage system, for that matter - emphasise the need for full co-operation based on mutual trust and understanding, between management and men. In one collective agreement, the responsibility of both sides is officially recognised, for the agreement provides, inter alia, for "Reciprocal Obligations.....It shall be obligatory (i) on the part of the employer to pay the full rate of wages for all output; (ii) on the part of the operatives to use their trade skill and productive ability to the best advantage

(1) Dr. W. McLaine (Amalgamated Engineering Union), writing in the "International Labour Review" of June 1944.

and fullest capacity, and with no restriction of output following a change of organisation or machinery." (1)

(1) Agreement of January 1946 between the Incorporated Federated Associations of Boot and Shoe Manufacturers of Great Britain and Ireland, and the National Union of Boot and Shoe Operatives.

The problem of rate-cutting, discussed in the last section, demonstrates how important it is that rate-fixing should be accurate from the very outset. Unfortunately it is not easy to find a fair output basis for rate-fixing purposes, but it is essential that the nearest possible approach to the ideal should be found.

In this country, piece-rates are usually calculated so as to give a reasonably skilled worker, working at a normal speed, a certain percentage over his basic time-rate. Mention has already been made of the fact that in the organised trades there are often negotiated agreements including specific provisions on this matter.⁽¹⁾ This specified percentage is frequently between 25 and 33 per cent, although the "Evershed" Report⁽²⁾ on the cotton spinning industry recommended that "the proper relationship between the piece-rate and the time base minimum will be expressed by calculating the piece-rate earnings of an operative of average skill and industry in a normal week to yield a wage not less than 20 per cent above the time base minimum." This is a lower standard than that operating in the engineering industry (27½ per cent) and the railway workshops (33-⅓rd. per cent) because in cotton spinning the worker only has partial control over the volumes of output. The speed of the machine is determined by the count of the yarn

(1) See, e.g. Appendix "B" (1) & (2)

(2) See Appendix "B" (4)

being spun, and the only way in which the operative can increase production is by shortening as much as possible the time taken to perform operations requiring the machines to stop, such as repairing yarn breakages, doffing, cleaning and so on.

Job Analysis

Whatever the percentage over time-rate may be, however, two problems have to be solved, viz. (a) What constitutes a normal or reasonable output per unit of time? and (b) What time-rate shall be taken as the basis? As regards the latter question, in the organised trades there are standard rates, fixed by collective bargaining, for each class of labour, which can be taken as a basis. Where there are no such collective agreements - and even where there are, so long as the agreed rate is regarded as a minimum - the modern technique of "job analysis" may be employed in the determination of base-rates. Only a brief mention of this method may be made here, as it is a study of its own, and has a well-documented literature, mainly of American origin. (1)

Job evaluation is a technique of grading occupations in terms of the duties involved; it is concerned with the job and not with the individual employee - the rating of individual employees is known as "merit-rating" and is dealt with in a subsequent section. (2)

(1) Vide: Smyth & Murphy: "Job Evaluation & Employee Rating" 1946
 Balderson: "Wage Setting based on Job Evaluation"
 Bengt: "Job Evaluation and Merit Rating" 1941. 1940
 "Job Analysis": A Classified and Annotated
 Bibliography" 1932.

(2) Vide post: chapter XV.

The job analyst watches the job being performed, and may question the operators and their supervisors, and then he writes up his analysis which will include details of all the operations involved in the job. He will also prepare a job specification, a statement of the physical and mental requirements of the job, which will be used for the interviewing of candidates, training of newcomers, and so on.

Ranking
Method.

After the job has been analysed it must be rated. The simplest method is by comparing the job with others of a comparable nature. This course may be satisfactory in a small plant, but not where there is a wide and complicated variety of jobs to be analysed. The jobs are listed, their relative positions varying from the highest valuations at the top of the scale to the lowest at the foot, depending on their relative difficulty and responsibility. This method of rating inevitably tends to be somewhat arbitrary, and the results are difficult to justify if exception is taken to them.

Factor
Comparison
Method.

The factor comparison method of job rating involves a comparison of jobs factor by factor instead of on an over-all basis. Jobs are analysed according to factors such as mental effort, skill, physical requirements, responsibilities and working conditions⁽¹⁾ and then arranged in order of their possession of these various

(1) These factors are listed and elaborated by Eugene J. Bengé, (who was largely responsible for the development of the method), in his "Job Evaluation and Merit Rating".

characteristics. Points are assigned to each factor, and are convertible into a money scale. When a certain number of "key jobs" have been rated in this way, new jobs are compared with the key job list and rated in relation to it.

Point Systems

The most fully developed method of job rating is that of the "point system", in which the relative worth of the various jobs is evaluated by assigning to each a number of points, which are convertible on a money scale. Such factors as those mentioned in the previous paragraph are taken, clearly defined so that the description means the same to all who read it, and then sub-divided into degrees, these also being very clearly defined in order to assist accurate rating. The various factors are weighted according to their relative importance, and a certain number of points are allocated to the succeeding degrees of each factor. Instead of being compared with each other, as in the two previous methods of rating, each job is compared with and rated according to the established points scale. Thus any error in rating is not carried over into another comparisons as it is with the ranking and factor-comparison methods. Since there is an established scale, in which the union representatives may have collaborated, it is much easier to explain and justify the rating of any job which is disputed. It is important to realise that no system of job rating can be mathematically accurate, but it does enable "controlled judgments, or educated guesses"⁽¹⁾ to be made

(1) Bethel, Atwater, Smith & Stackman: "Industrial Organisation and Management". p.563.

which will approximate to the ideal. Determination of the weights to be allocated to each factor is a difficult problem, as is also the standardisation of job-raters' judgments so that several raters investigating the same job will assess it similarly.

Rate-fixing. Job analysis enables management to fix the time-rates which is to be the basis of the piece-work prices, but it does nothing towards answering the other major problem of rate-fixing, viz. "What constitutes a normal or reasonable output per unit of time?" There is inevitably a difference of opinion between management and men on this point, the former being desirous of keeping down costs, and the latter wishing to have the quantum of work set as low as is feasible.

The traditional method of rate-fixing is to base the rates on past experience of operation times, e.g. if the time usually taken to do a particular job is 30 minutes, the time-rate is 2/- per hour, and the agreed percentage over time-rate⁽¹⁾ for piece-work prices is 33-1/3rd., then the piece-price will be 1/4d. (40 minutes at 2/- per hour).

(1) Some have claimed that there should be a definite guarantee given of a certain percentage over time-rate, irrespective of output, owing to the fact that piece-work involves extra intensity of effort over time-work. This would not seem to be justified, however, for (a) it would be unfair to time-workers who would still be paid at a lower rate, and (b) the piece-workers would probably not bother to work any harder than before, knowing that they were sure of getting their enhanced payment anyway.

Frequently, however, when piece-work is replacing daywork, it will be found that the time taken to do the job under daywork has been excessive. If this time is used to fix the piece-rate, the employer tacitly agrees that the past rate of output should be made the basis of future working. But this will mean that piece-rates will be "loose", and the level of costs may prove crippling when output goes up under the stimulus of the over-strong financial incentive. Piece-work is not the remedy for low output caused by inefficient production control and supervision. The remedy rather lies in re-organisation, which may be costly to undertake, but will not be a permanent mill-stone as would piece-work founded on loose job-rates.

Time-study. It has been contended that "when rates are set by the ordinary methods of past performances and judgment, the earning power of the same operator on different kinds of work usually varies from the average by 25 to 60 per cent. On the other hand, where rates are set by unit time or motion studies....this variation is actually reduced in practice to well under 5 per cent."⁽¹⁾ Although this may be an over-statement of the case for time-study as a basis for rate-fixing, there is no doubt that it does give very much more accurate results than the traditional methods. Its use has always been more widespread in the United States than in this country, but more and more British employers are using time-study methods for setting rates on jobs

(1) Bulletin of the Taylor Society, Vol.XIII, June, 1928.

which are repeated many times. This extension of the use of time-study is mainly confined to mass-production plants, where conditions of working are standardised, and the processes are repetitive and mechanised. In job-production plants the traditional methods of rate-fixing are still widely employed. The use of time and motion study, particularly when coupled with job analysis, enables very accurate prices to be fixed, and reduces the danger of rate-cutting and the other evils discussed in the previous section. If rates are not accurately set there is a danger of continual conflict arising from workers trying to force up the "tight" prices, and employers trying to force down the "loose" ones, and the consequent strain on industrial relations inevitably retards production.

As in the case of job analysis, so with time and motion study, the practical details of the technique are outside the scope of the present study, and again the method has a large literature of its own. (1) Only a brief account will, therefore, be given here. The objects of time and motion

(1) Vide, e.g. Hendry: "A Manual of Time and Motion Study" 1946.

"An Introduction to the Theory and Application of Motion Study" H.M.S.O. 1945.

Lowry, Maynard & Stegemerten: "Time and Motion Study & Formulas for Wage Incentives" 1940.

Carroll: "Time study for Cost Control" 1943.

Barnes: "Motion and Time Study" 1940.

Shumard: "A Primer of Time Study" 1940.

Chane: "Motion and Time Study" 1942.

study have been defined as: "To subject each operation of a given piece of work to a close analysis, in order that every unnecessary operation may be eliminated and to determine the quickest and best method of performing each necessary operation; also to standardise equipment, methods and working conditions; then, and not until then, to determine by scientific measurement the number of standard hours in which an average man can do the job".⁽¹⁾

Many firms which employ time-study for rate-fixing do not secure the full benefit which they might gain because they do not employ the associated technique of motion study. The first step should always be a thorough analysis of the job in order to discover any possible way of improving efficiency by eliminating unnecessary movements, reducing as far as possible sudden changes in direction of movements, using both hands simultaneously, employing habitual, rhythmic and natural movements, and so on. Frank B. Gilbreth, the "father" of motion study, developed the method of dividing each operation up into its component parts, and then seeking the answer to these two questions: (i) "Is this movement absolutely necessary?"; and (ii) "If so, is it being done in the most efficient manner possible?" Not until all possible improvements have been made in the job should it be timed for the purpose of rate-fixing; otherwise the pricing may later prove to be "loose" as workers find ways and means of improving the method of working.

(1) Lowry, Maynard & Stegemerten: "Time and Motion Study".

This division of the operation into its elements is essential for satisfactory time-study, for it enables a much more accurate study to be made. One of the difficulties encountered in time-study work is that the workers may adopt a "go-slow" policy when the study is being made, knowing that if the rate is slack this will enable them either to take things more easily, or by working at their normal speed to earn abnormally high wages. By timing each element separately, and studying a number of different workers, the time-study engineer can keep a better check on this practice. The workers may, for example, agree among themselves that a job should take six minutes to complete, but if the time-study engineer times the elements separately, he may find that worker "A" does element (i) in one minute, worker "B" in $\frac{3}{4}$ minute, and worker "C" in $1\frac{1}{4}$ minutes. Element (ii) may take "A" 3 minutes, "B" 4 minutes, and "C" 2 minutes. Element (iii) may take "A" 2 minutes, "B" $1\frac{1}{4}$ minutes, and "C" $2\frac{3}{4}$ minutes. All the workers have taken six minutes over the whole job, but the shortest time for each element is (i) $\frac{3}{4}$ minute, (ii) 2 minutes and (iii) $1\frac{1}{4}$ minutes, making a total of 4 minutes instead of six.

This division of a job into its elements can ~~be~~ in certain cases ^{be} made the basis of what might be called "pre-determined rate-fixing", as has been done by at least one large manufacturer of electrical apparatus. In this case,

it was found that many elements were common to a wide range of operations, e.g. (a) picking up piece from tray, (b) applying lubricant to drill, (c) grasping drill handle, and so on. These standard elements, combined in various ways, made up the various jobs which had to be performed. Thus, if each element could be time-studied and a comprehensive list made of the standard times, any job which was made up of a number of those standard elements could have its rate fixed as it were synthetically.⁽¹⁾ This was, in fact, undertaken, and at present the rate-fixing department has standard times for all the elements normally found in the jobs performed in the plant, and a rate can be given for an individual job without actually time-studying that particular operation, but simply by building it up from its several standard elements. One great advantage of this method is that, since the times fixed for the elements are used as standards and are employed time and time again, it is justifiable to spend much more time and effort on the establishment of an

(1) The system was at first termed "synthetic rate-fixing", but this name was subsequently abandoned for a very interesting psychological reason. The term "synthetic" has come to be associated in the minds of the workers with war-time substitutes, inferior to the real thing, and the firm found that the name attached a similar stigma to the rate-fixing system! After a considerable amount of heat had been generated by this trivial point, the system eventually became quite acceptable to the workers under the revised title of "pre-determined rate-fixing".

accurate time than would be warranted for the timing of an ordinary operation. Ten time-studies are taken on each of ten operators, giving a hundred timings in all, from which the standard time is selected.

An element is regarded as the smallest definable movement an operator makes in the performance of a complete operation; sometimes it is so small that it is impossible to time and it has to be timed in conjunction with another small element adjacent to it. The pictorial diagrams⁽¹⁾ shew the build up of elements - including some of these small amalgamated ones - to form three complete operations, a simple drilling operation, a forming operation and a capstan operation.

The basic principles are the same whether the work is machine, finishing or assembly. The accompanying rating form⁽²⁾ shews how the job-rate is built up from the standard times of the component elements. This card is kept in the shop office and is made available to the operator who can, if he wishes, challenge the rate should he consider that the build-up does not correspond with the elements which he is performing. This frank disclosure of the method and details of rate-fixing tends to dispel suspicion and improve relations between operators and rate-fixers.

By this method of pre-determined rates it is possible to establish the cost of a job before the work on it actually commences, enabling the sales department to give a

(1) Vide Appendix "B"(5), (6) and (7).

(2) Vide Appendix "B"(8).

tender based upon an accurate cost of production figure rather than an estimate. Again, the fact that all the elements in a potential job are already timed, enables the production department to plan a more accurate works schedule, and offer a more certain delivery date to the firm's customers. The method clearly has definite possibilities, and it may be expected to gain in popularity by virtue of the considerable advantages which it offers.

The stop-watch is the commonest device used in time-study; a more elaborate method is to take a motion film of the operation, including a clock in the picture, and keeping a check on the speed of the camera. This method is more costly, but it has the advantage of giving a permanent record which can be used for subsequent training purposes. The film can be run through at slow-motion in order to shew trainees how the high-speed operations are carried out. A further advantage of the camera technique is that the question of a change of method is never in any doubt - there is ~~a~~ permanent record of how the job was originally performed and there can be no room for dispute.

Rating.

Even though it is usual to take a number of studies before fixing a rate, it is not always practicable to take a sample of a size that would give a statistically accurate average. This involves studying a number of workers, and studying each one several times in order to smooth out fluctuations in speed of working. Instead, the time-study engineer often seeks to "normalise" the

performance, by adjusting the actual time taken to what he considers the average time of the normal worker should be. He "rates" the operator's speed of working on a points basis, similar to that employed in the Bedaux system⁽¹⁾, taking 60 points as the normal speed of working (since there are sixty minutes in an hour). Thus, if the time-study engineer felt that the operator was working at 25 per cent greater speed and effort than the normal, he would give him a rating of 75, and apply this leveling factor to the recorded time in order to bring it to the normal which could reasonably be expected of the average operator working over a considerable period of time.

This rating process is a frequent source of criticism of the time-study method of rate-fixing, and the workers often contend that the rating is a purely arbitrary process which completely destroys the scientific accuracy of the time-study. It is certainly true that the rating can never be mathematically accurate since, "after all, it is not the stop watch which determines the standard time, but the judgment, experience and fairness of the time-study man".⁽²⁾

Allowances.

The scientific accuracy of time-study rate-fixing, is further undermined by the fact that allowances of

(1) Vide post: chap. XIII.

(2) Kress, in the Bulletin of the Taylor Society, Vol. XIII
June 1928.

(Rating is more fully discussed in Chapter XIII.)

various kinds, involving elements of judgment and opinion, have to be added to the recorded times in order to give the task time. In the first place an allowance must be made for fatigue, particularly in heavy work.

"Difference between work a man can do for short times and what he can maintain, is greater than realised.

There may be 40 per cent variation between daily production of good worker and that which would result from his rate at times during the day. For poor workers this variation is even greater. A rapid pace (1) for a short time does not prove that it can be maintained."

Allowances for fatigue are particularly difficult to assess; in one investigation it was found that a third of the companies in question gave no allowance for fatigue, whilst others gave as high as 65 per cent

allowance(2) Up to about 5 per cent will be allowed for personal needs, and there will be allowances for unavoidable delays, and in some cases a "process allowance" where the operator has to be idle for part of his time due to machine speeds, the requirements of particular processes, and so on. All allowances are at best nothing more than educated guesses, so that the final result is made up of a combination of some accurate measurements and some guesses,

(1) Roe and Lytle: "Operation Study and Rate Setting" in "Management Handbook" 1924.

(2) Stearns, in the Bulletin of the Taylor Society, Vol. XIII. June 1928.

and it is the accuracy of the latter which determines the accuracy of the final result. This element of arbitrariness tends to make workers suspicious of time-study unless every care is taken to ensure their co-operation by taking them into the confidence of the management in joint consultation.

Time-study and the Worker.

Time-study has always been a source of trouble in industrial relations, and has been denounced by the trade unions, who claim that it destroys craftsmanship and enables management to rob the worker of his reward for extra effort expended. Generally, however, the opposition comes not so much from official trade union sources, but from the workers themselves. Official trade union policy seems to be coming to recognise the place of time-study in modern management, if properly and fairly administered, and a recent trade union pronouncement⁽¹⁾ suggested that the time was ripe for the abandonment of the traditional trade union opposition to the techniques of scientific management such as time and motion study.

It must be admitted that the trend of modern industrial developments - time-study among them - is towards the elimination of craftsmanship, and the reduction of the worker to a mere cog in a machine. Professor G.D.H. Cole⁽²⁾ quotes the story told by Miss Isabel Sloan on her return from visiting scientific management

(1) By Mr. C. Dukes, O.B.E., retiring President of the Trades Union Congress, at Brighton, October 1946.

(2) "Payment of Wages" p. 58.

factories in America. One factory manager proudly pointed out a worker who seemed to be working very efficiently and quickly. "That", said he, "is our best worker. Of course, he is a little feeble-minded!" Many workers object to time and motion study because they contend that the data collected may be used by the management for the purpose of speeding up even to the point of "slave-driving".

Choice of
Subject.

This view is supported by the fact that many time-study engineers conduct their observations on very fast workers, claiming that they will have a better rhythm of work and therefore give better results. This was the view put forward by F.W. Taylor and it is widely held, particularly by American time-study engineers.⁽¹⁾ Even if allowances are made in favour of the more average worker, this does not satisfy the critics, who feel that it is an unfair system designed to over-speed the ordinary man. It is true that one should not expect men to work at a speed which will in the long run prove injurious to health, and it would seem to be wiser to conduct the studies on workers of good average ability rather than on exceptionally fast men.

In one mass production plant where time-study is widely employed, workers chosen for time-studying are selected jointly by the management and the shop stewards.

(1) Vide, e.g. Piacitelli: "Selection of Workers for Observation" in the Bulletin of the Taylor Society, Vol. XIII, June 1928.

The latter are allowed to watch the timing in order to ensure the job being fairly done, and they are paid their average wages for the time spent in this way.

In another large mass production plant, engaged in the motor industry, the rate-fixers, after time-studying a job and fixing the rate for it, have to demonstrate that the time is reasonable by doing the job themselves for a whole day in the scheduled time. This automatically disarms criticism from the workers that the timing is too tight.

A further precaution which must be taken is to ensure that as far as possible the conditions under which the time-study is taken are those which will obtain normally in the factory. A time-study is a kind of laboratory experiment, and the conditions of work and the reactions of the personnel may not be entirely natural. The management, for example, may arrange tools and supply materials more efficiently than usual, and unless this is going to be a permanent feature it will distort the results and cause difficulty with the staff. In some cases it will be impossible for actual working conditions to be identified^{cal} with those obtaining when the study was made. Different pieces of steel will be of varying hardness, and will, therefore, take varying times to turn on a lathe; different lengths of cloth may be of different texture; weather conditions may affect the materials or

the processes; hold-ups may occur in the supply of raw materials and partly finished goods - all factors outside the control of the workers, and yet factors which still influence speed of working.

Summary.

In view of all these difficulties, the need for full co-operation between management and men is evident. Every opportunity should be taken to gain the confidence of the workers, and full use should be made of the channels available for joint consultation on these problems. A piece-rate committee may be set up to provide machinery for the discussion of rating matters, and in the event of dispute the matter should be referred to this body for settlement. If the shop steward is allowed to share in the time-study arrangements, a guarantee given that no arbitrary action will be taken without reference to the workers' representatives, and the machinery of joint consultation fully employed, there is no reason why the problems should prove insoluble.

It may be concluded, therefore, that despite all its associated problems, time-study does provide the best method at present available of fixing piece-work prices. Without it, rates are unlikely to be accurate, involving the danger of rate-cutting and a host of other difficulties. Time-study is particularly valuable in repetitive work, where operations are performed many times by a large working staff. Obviously in such circumstances it is desirable to limit the movements performed to the minimum, for any waste of effort

or time involved in each operation may be multiplied hundreds of times during the course of a single day. Similarly, any error in rate-fixing will be multiplied, and if the rate is loose, costs may be unduly inflated. In the case of batch- and job-production plants, as in small-scale engineering for example, it may still be profitable to employ time and motion study, for in the manufacture of the various individual machines, many of the processes will be reducible to standard operations, which may, by time-study, be put on a satisfactory piece-work basis. In the definite craft trades, of course, neither time-study nor piece-work is suitable.

III. MUTUALITY AND PRICE-LISTS.

"Mutuality" The traditional method of negotiating piece-work prices is that known as "mutuality", which means that "the prices to be paid (are) fixed by mutual arrangement between the employer and the workman or workmen who perform the work." (1) This is still the method adopted over a large part of the industrial field, particularly in job-production plants where the number of different operations is large and the number of times each is performed is small. The negotiating may be done by individual workers, groups of workers, shop stewards or shop committees. In the unorganised trades the workers are in a much weaker bargaining position compared with their employer, and there may be no minimum time-rate guarantee, no rate-cutting guarantee, and no question of bargaining over rates - they may be fixed by the employer on a "take it or leave it" principle. This attitude is less likely to be found where labour is unionised, and in times of labour shortage when the employer is anxious to keep his staff.

Bargaining with individual workers nowadays is somewhat unusual, and there is usually an element of collective action introduced whereby the men decide among themselves what level of prices they are prepared to accept. This common action may express itself in formal shape in the formation of a shop committee or piece-work (1) National Engineering Agreement of 1907.

committee, charged with the duty of negotiating piece-work prices with the management. Ideally this should not be representative merely of the workers, but should be a channel of joint consultation.

Price-Lists. In many highly organised trades there exist lists of piece-work prices covering the most commonly found operations or products. The price-list is only found where operations or products are more or less standardised, but as standardisation and large-scale production are extended, the field of price-lists grows and that of mutuality diminishes. The growth of collective bargaining, too, has extended the scope of price-lists and the development of this system is one of the most outstanding achievements of trade union practice.

Standard lists can only be drawn up where there is the maximum possible degree of collective bargaining between employers' associations and the trade unions. Then again, the operations must be such that output can be calculated fairly easily on a numerical, weight, yardage, or some similar basis, and conditions of working must be such that, within reasonable limits, a given amount of effort and skill always produces a given output. The price-lists existing in the cotton industry have been discussed in a previous section⁽¹⁾ and it is here that the method is most highly developed. These cotton lists did not come into existence all at once, but developed from the lists of individual

(1) Vide chap. VIII.

mills, through the district list stage, and ultimately to the uniform lists in use in North and North-East Lancashire for cotton weaving. Spinning lists are not universal, but district in character, as are also the lists for other sections of the cotton industry. In the iron-founding industry there is a national list⁽¹⁾ for the moulding of "rainwater and soil goods", a section of the industry in which there is a considerable element of standardisation of processes and conditions of work.

Many piece-work price-lists are of a district character, as in the ship-building industry⁽²⁾, wool, and boots and shoes. In the mining industry there are separate lists for each pit or seam. In the manufacture of boots and shoes, Local Boards of Arbitration prepare piece-work lists for their various districts upon the principle "that it is desirable as far as possible that a uniform system of prices should obtain....so that the essential conditions and prices can be applied or adapted to the same class of labour and materials in all areas producing similar classes of goods."⁽³⁾

Summary.

To sum up the position relative to piece-work price-lists, we have seen that, for success, a given amount of

(1) Vide Appendix "B" (9).

(2) Vide Appendix "B" (10) and (11).

(3) Agreement of January 1946 between the Incorporated Federated Associations of Boot and Shoe Manufacturers of Great Britain, and the National Union of Boot and Shoe Operatives.

skill and effort must always produce a given output. This raises the problem of defective materials, such as bad yarn for the weaver or bad castings for the turner. A similar difficulty is raised by mechanical breakdowns, which are frequently encountered in machinery which has been over-driven to meet the exigencies of war. Then again, conditions vary widely from one factory to another; in one, machinery is up-to-date, in another, old-fashioned; one plant is well planned, lit and ventilated, another is ill-arranged, gloomy and stuffy; organisation of work is good in one firm, bad in another; and so on through a whole catalogue of divergencies. To meet all these difficulties, the price-list necessarily becomes extremely complicated, and as revisions take place and new jobs are added to the list, the machinery of negotiation has to be kept almost constantly in operation.

Where there is a sufficient degree of standardisation, however, the price-list system offers considerable benefits to employer and worker alike. The necessity for individual bargaining is eliminated, and there is a clearly understood basis which should reduce friction and ill-feeling between employer and worker. The employee has the advantage of piece-rates fixed by collective bargaining between employers and trade unions whose bargaining power is much greater ~~is much greater~~ than that of the individual worker or ad hoc association of

CHAPTER XII.

workers. The wider the area covered by the price-lists the greater the advantages gained, but the more difficult does the problem of diverse conditions become. The straight piece-work system, of course, has its peculiar disadvantages, among them particularly the difficulty of accurate rate-fixing, and also the fact that piece-work yields a fixed labour cost per unit with increasing output (this latter being a disadvantage only from the employer's point of view). These two factors have been the primary motivating forces in the development by employers of alternative systems in which the benefit of any time saved is shared in some definite proportion between the employer and the employee.

The essence of these premium bonus systems as they are called, is that the piece-rate per unit of output declines as output goes up; then if, owing to difficulties of measurement, the rate is fixed too high, the effort is not so serious for the employer as it would be under straight piece-work. Not only so, but if new facilities or methods are introduced, enabling the work to be done in a shorter time, no revision of the time allowed may be necessary since the employer automatically shares in the benefit of any time saved. If the change is very comprehensive or fundamental a revised rate of course, has to be made, but since the piece-rate falls as output rises rate-fixing does not need to be so accurate as in piece-work, where even small changes in method necessitate revision of the piece-

PREMIUM BONUS SYSTEMS.

Mention has already been made, when considering the straight piece-work system, of some of its peculiar disadvantages, among them particularly the difficulty of accurate rate-fixing, and also the fact that piece-work yields a fixed labour cost per unit with increasing output (this latter being a disadvantage only from the employer's point of view). These two factors have been the primary motivating forces in the development by employers of alternative schemes in which the benefit of any time saved is shared in some definite proportion between the employer and the employee.

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price. ~~this~~

The falling piece-rate also gives to the employer the advantage of falling labour-costs with increasing output. Thus, whereas straight piece-work offers an incentive to the worker, premium bonus systems offer also an incentive to the employer to increase output by providing better facilities, tools, flow of materials and working conditions. Since the employer knows that these improvements will reduce not only unit oncost but also unit labour-cost, he has a definite quid pro quo for his additional expenditure. The "Evershed" Committee on the Cotton Spinning Industry realised the importance of this, for it reported: "Where increased production or its equivalent is attributable to the installation of new machinery, improvement or re-arrangement of old machinery or to new methods of labour deployment, some part at least of the financial benefit must go to or be retained by the employer so as to provide an incentive to the installation of such new or improved methods or machinery. Having regard to the capital cost which may be involved, the saving to the firm arising from the greater spread of overheads would not normally be a just or sufficient return." (1)

Origins of
the Halsey
System.

One of the best known of the premium bonus systems is the Halsey method, introduced in 1890 by Mr. F.A. Halsey, an American engineer, and superintendent of the Rand Drill Company of Sherbrooke, Canada. The method was introduced

(1) Ibid para. 29.

into this country by Messrs. G. and J. Weir of Cathcart, and is frequently known in Britain by the name of that firm.

Mr. Halsey brought the claims of his method before his fellow engineers in 1892,⁽¹⁾ and emphasised that it overcame the "fundamental fault of the piece-work plan", namely that "any increase of effort by the workman redounds to his own benefit alone - the employer having no share in the consequent saving of time", whereas under day-work "any increase of effort by the workman redounds solely to the benefit of the employer". These objections were pointed out to be "the exact antithesis of one another", and Halsey claimed that his premium plan "in a sense splits the difference between the day-work and the piece-work plans".⁽²⁾

The Halsey plan purports to be an attempt to harmonise the apparently conflicting interests of employer and employee in this regard. "While the employee desires high wages per day, the employer desires, and if he is to live must have, low wages per unit of product...." Under the premium bonus system "the workman is paid by the day, and is expected to produce a minimum amount of work for his day wage. But for any excess of output beyond that minimum he receives a premium, the amount of the premium being based on the excess, and being less per unit of

(1) American Society of Mechanical Engineers - Transactions, Vol. XII.

Vide also: "American Machinist" 25th. January 1902.

(2) "American Machinist" 9th. March 1899.

product than the old wages cost,"(1)

The Working
of the Halsey
System.

The British premium-bonus systems are fundamentally different from their American counterparts in that the task times are not fixed by time-study. In the American systems, the worker is not really expected to improve on the times set, but only to reach them. Since the British systems do not set a task time on a rigorous scientific basis, the bonuses are paid on the basis not of output per se but of time saved, that is to say, they are designed to encourage the worker to do the job in less than the allotted time.

A certain time is allocated to each job, determined from previous experience of average operation times on the day-work system, and the worker is offered an agreed percentage of the wages of any time saved, in addition to the day rates for the time taken. Halsey was not dogmatic with regard to the percentage bonus which should be paid, but suggested that it might be 33-1/3rd. per cent. He felt that the time allowed should be liberal rather than the bonus percentage, since if too high a premium was offered the incentive might so encourage increase in output that wages would rise to abnormal levels. When the Halsey method was introduced into Britain by Messrs. G. and J. Weir of Glasgow, they fixed the bonus at 50 per cent, and the majority of British firms which adopted the system have followed this precedent. For this reason the method is sometimes known as the "50-50 Sharing Plan", and this equal

(1) F.A. Halsey, in "The Engineer" January 1902.

division of the time saved is more easily negotiated with the workers, who are more likely to feel that they are being fairly treated. Once the operation time has been fixed, it remains unaltered unless the method of doing the job is changed.

Assuming that the Halsey-Weir bonus of 50 per cent applies, the formula is:0

Wages = (Time taken plus half of Time Saved) x Rate per hour. For example, if the operation time is two hours, and Worker A does the job in an hour and a half, he saves half an hour, and his wage will be:-

$1\frac{1}{2}$ plus $\frac{1}{4}$ = $1\frac{3}{4}$ hours at, say 2/- per hour = 3/6d. Since he receives 3/6d. for $1\frac{1}{2}$ hours work, his real hourly rate is 2/4d. instead of 2/-.

If, however, he manages to complete the task in one hour, he saves an hour, and his wage will be:-

1 plus $\frac{1}{2}$ = $1\frac{1}{2}$ hours at 2/- per hour = 3/- and his real hourly rate is 3/- per hour.

It will be seen that as his speed of working increases, the worker receives a constantly diminishing price for each successive unit of output; if he does the job in the standard time he receives 4/-; if in $1\frac{1}{2}$ hours, 3/6d; if in 1 hour, 3/-. This diminishing piece-price is of the essence of the premium bonus systems; it gives the employer the advantage of falling labour costs per unit of output as the latter increases. It also, meets, to some extent, the

difficulty of rate-fixing, for if the rate is fixed too high (that is, the operation time is too liberal), the results are not so serious to the employer as they would be under straight piece-work, for the piece-rate automatically cuts itself as output rises. (1)

Although this arrangement is an advantage to the employer, it constitutes a serious disadvantage from the worker's point of view, since he gets only half the benefit of the time he saves, and he often feels disgruntled at having to share with his employer the fruits of his own efforts. Many contend that the system is unfair in that the harder a man works the less he receives for each extra increment of energy expended. This is psychologically unsound for, after a certain point, each additional unit of output produced involves an ever-increasing "real cost" to the worker, which cannot be adequately rewarded by a constantly diminishing piece-price. Indeed, even if the piece-price per unit remains constant with increasing output, the worker may not be adequately rewarded, for, owing to the operation of the economic "law of diminishing marginal utility", each additional increment of income gives to the recipient less satisfaction than the one before. There is therefore, a case to be argued for an increasing piece-rate as output rises.

Origins of
the Rowan
System.

Another premium-bonus system, worked on a somewhat different basis from the Halsey, is that which goes by the name of its inventor, Mr. James Rowan, of the firm of

(1) This is shewn graphically in Appendix "C".

David Rowan and Co., Glasgow, Introduced into their marine engine plant in 1898, the Rowan System is designed to meet even more drastically than does the Halsey plan the difficulties arising out of bad rate-fixing and its inevitable concomitant - rate-cutting. "There inevitably comes a time - if the workman continues to improve in skill, or to give evidence of a continuous and successful application of intelligence to his work - when the gains of the workman appear excessive compared with his former earnings as a mere supplier of labour by the hour. The employer would be more than human who did not, at this stage, ask himself the question 'Have I not made a mistake in fixing prices?'"⁽¹⁾ In many cases this condition will remain merely incipient, for the workman soon discerns the level of earnings regarded as normal by his employer, and he knows that if his earnings rise above this level a cut in prices can be expected. Consequently the worker deliberately restricts his output to that level, and the piece-work system becomes merely a disguised form of day-work.

Rowan set out to discover a system which would give a guarantee against arbitrary rate-cutting, thereby reducing the possibility of deliberate restriction of output, and yet at the same time give to the employer some participation (apart from the reduction of unit overhead costs) in the benefits of increased output. He felt that the employer

(1) Mr. Slater Lewis, in the "Engineering Magazine" Vol. 18, 1899-1900.

could not guarantee not to cut rates under the straight piece-work system, for there was at that time no satisfactory method of fixing piece-rates with any degree of accuracy. Not only so, but the straight piece-work system did not give the employer that element of participation in time saved, which Rowan considered essential if there was to be any incentive to the employer to increase the efficiency of his plant.

Outline of
the Rowan
System.

Thus the origins of the Rowan system are much the same as those of the Halsey method, but the calculation of the bonus is on a different basis. Like the Halsey plan, this system does not demand scientific time studies for rate-fixing, but a time is allotted to each job on the basis of past experience of operation times, and if the worker "reduces this time allowance, his rate of wages per hour, while he is working at the job, is increased by the same percentage as that by which the time allowance has been reduced." (1) For example, if the operation time is reduced by 10 per cent, a bonus of 10 per cent is paid on the wages of the time actually taken to do the job.

When the work is issued to the employee, he is given a job ticket with a description of the work to be done and the time allowed to do it. The work completed, the job ticket is initialled by the foreman,

(1) Paper read by Mr. James Rowan before the International Engineering Congress held in Glasgow in 1901.

who records the time taken, and when the work has been examined and passed by the inspection, the job ticket passes into the Rate-Fixing Department for payment. If the work does not come up to standard, the worker loses his premium on that particular job.

The formula for calculating wages under the Rowan system is:-

$$\text{Wages} = \left(\text{Time taken plus } \frac{\text{Time taken} \times \text{Time saved}}{\text{Time allowed}} \right) \times \text{Rate per hour}$$

Take the cases used in the illustration of the Halsey system. Worker A does in an hour and a half a job for which the time allowed is two hours, the rate per hour being 2/-. His Wage will be:-

$$1\frac{1}{2} \text{ plus } \frac{1\frac{1}{2} \times \frac{1}{2}}{2} = 1\frac{7}{8} \text{ hours at } 2/- = 3/9d.$$

If he manages to do the job in one hour, he receives:-

$$1 \text{ plus } \frac{1 \times 1}{2} = 1\frac{1}{2} \text{ hours at } 2/- = 3/-.$$

Thus the Rowan system gives a more generous payment than the Halsey-Weir (with 50 per cent bonus) until the time saved is 50 per cent of the time allowed. After this point the Rowan bonus is less than the Halsey, giving a more certain safeguard against loose time fixing. If the time allowed has been badly over-estimated, the effect will not be so serious from the employer's point of view as it would be under the Halsey plan. The worker can never secure a 100 per cent bonus since this would mean doing the job in no time at all, and saving the whole time allowed.

Advantages
of Rowan.

Professor Barr of Glasgow, who employed the Rowan method in his own manufactory, and was an active protagonist of it, wrote: "the Rowan system,,,gives a larger premium than the Weir system for small savings in time, and a smaller premium for very large savings. But if a man can do, say, four pieces in the time allowed for one, that must be put down to a wrong estimate of the reasonable allowance of time, and not to the workman working four times as hard, or as effectively, as he would be expected to do if on timework. The Rowan system would appear, therefore, to be much more rational since, while giving the workman greater inducement to increase his productiveness on a reasonable estimate of the time in which he may be expected to do the work, it provides against an unreasonable remuneration being given on account of an erroneous estimate having been made by the rate-fixing department of the time a piece of work should take. It is, I think, reasonable to assume that a workman will not be entitled, on account of extra exertion, to receive more than double the wage he is prepared to accept, and has agreed to accept, on time work. The inducement to cut rates is, therefore, almost eliminated under Rowan's system, even if a very liberal estimate has been made." (1)

For this reason the Rowan system is used principally in engineering firms whose jobs are largely non-repetitive,

(1) "The Engineer" 18th. April 1902.

so that the expense of making elaborate time-study analyses for rate-fixing is not warranted. In these circumstances, price-fixing tends to be rather "loose" and the Rowan system guards against heavy losses to the employer on this account. As, however, with only reasonably accurate rate-fixing, workers are not likely to be able to cut times by more than half, the Rowan method in practice tends to be more generous than the Halsey-Weir. It may, in fact, be so generous as to defeat its own ends, in so far as it makes it easy to earn a substantial bonus with only moderate effort, and gives comparatively little inducement to very great attempts to increase output.

One advantage of the premium-bonus system is that when improved methods are introduced which enable the job to be completed in a shorter time, there is no need to "block" payment until the job has been investigated with a view to altering the rate, for the increase in bonus is not so great as it would be under straight piece-work. It is also an advantage where an incentive scheme is being newly installed and the management is not sure of the accuracy of the time values. It is impossible for the worker to earn 100 per cent bonus or over, so that there is no need to fix maximum limits. Some employers fix a minimum bonus, giving a guaranteed wage above the time-rate level, but this detracts from the incentive value of the premium-bonus plan, and may give rise to demands for

increases from day-workers not on bonus.

Attitudes to
Sharing of
Time saved.

The Rowan system, like its near-neighbour, the Halsey-Weir plan, has very definite limitations, and neither method is really popular today. Firms which have used premium-bonus systems for some time - notably some Scottish engineering firms - still retain it and operate it successfully, but few companies are instituting it for the first time, mainly because of the men's objection to sharing the time saved with their employer. Although the time allowed may be more generous than in the case of straight piece-work, the sharing of the time saved is yet a powerful disincentive. The worker argues that the employer unfairly secures a dual advantage; in the first place, he only pays for part of the time the worker saves; and secondly, the employer automatically has the benefit of spreading oncost over a larger volume of output.

Employers reply that falling labour costs are necessary in order to enable them to meet competition and sell the larger output produced. Then again, they say, the worker should not have the full benefit of the time saved, since part of this saving is caused by the efforts of the employer in providing improved management, machinery, tools, inspection methods, conditions of work, and so on.

In any case, wherever premium-bonus systems are operated nowadays, the time allowances are so liberal that the sharing of the time saved is something of a fiction.

We have already seen that in the organised trades there are frequently agreements stipulating that piece-work prices and bonus times shall be such as to enable the average operator to earn so much, say 25 per cent., over his time-wage, and even where there is no formal agreement this is the usual practice. This means that when the rate-fixing department has measured or estimated the time required to complete the job, a certain addition is made in order to give the required bonus over time-wages. If this is to be 25 per cent, the following additions will be made:-

Piece-work	25 per cent.
Halsey	75 " "
Halsey-Weir	50 " "
Rowan	33-1/3rd. per cent.

If the required bonus for an average man is 33-1/3rd. per cent., the following are the additions to the estimated time:-

Piece-work	33-1/3rd. per cent.
Halsey	100 " "
Halsey-Weir	66-2/3rds. " "
Rowan	50 " "

It was not James Rowan's original intention that these additions should be made, however. "For premium-bonus, the standard time or time allowed is the average time which the average workman takes to do the job under ordinary time-rate conditions, whilst giving a fair day's

output for his time wages - no more and no less." (1)

This would not satisfy the trade union demand that wages under payment-by-results should be at least about 25 per cent above time wages, and would not, therefore, be acceptable today.

Where these allowances are made, however, the premium-bonus systems - although less favourable than piece-work to the quick worker - are more favourable than piece-work to the slow worker, a fact which is not generally appreciated when the sharing of time saved is under discussion. (2) Nevertheless, the psychological disincentive of the sharing of gain with the employer remains, even though the standard times are liberal and so adjusted that the average man earns the same percentage over time-rate whether he is on straight piece-work or on premium-bonus, and it is doubtful if its ill effects upon employee relations can ever be fully eliminated. Although the recent committee (3) reporting on cotton spinners' wages felt that the employer should share in any time saved as a result of enhanced plant efficiency as well as greater employee effort, they found it "a much more difficult matter" to give practical expression to this theory. They concluded "that the full benefit of all increased

(1) Sir Wm. Rowan Thompson: "The Premium Bonus System" p. 39.

(2) Vide Appendix "C" (1).

(3) "Evershed Report" on the Cotton Spinning Industry, 1945.

production or its equivalent should belong to the operatives as representing the fruits of their own skill and energy."⁽¹⁾ The report continued: "If the piece-rate incentive is to be real, the operative must feel assured that additional effort if made will not result in reduction in the piece-rate."⁽²⁾

Trade Union
attitude to
Premium-bonus.

When the premium-bonus system came to the fore just after the turn of the century, the unions at first opposed it strenuously. This hostility was, however, to some extent modified by the fact that a number of influential people in the world of labour favoured the new method, including Mr. G.N. Barnes, then Secretary of the Amalgamated Society of Engineers, the principal society in the engineering industry, and Mr. Sidney Webb (latterly Lord Passfield). In August 1902, the Carlisle Agreement was drawn up between the Amalgamated Society of Engineers and the Engineering Employers' Federation, under which the union accepted the premium-bonus system on condition that the Employers' Federation agreed to advise all employers using the system to introduce certain safeguards. It was agreed "1. That the employers' representatives should convey the terms of the following memorandum to the members of the Federation; and 2. That the representatives of the Amalgamated Society of Engineers should, on the other hand, remove all restrictions to the working of a bonus system in

(1) Ibid, paragraph 30.

(2) Ibid, paragraph 31.

federated workshops." The text of the memorandum - popularly known as the York Memorandum - reads as follows:-

"The employers' representatives have not the power to settle the conditions which should be observed in connection with the working of a bonus system without having previously obtained authority from the Federation in proper form. They are, however, prepared to advise all employers who wish to establish such a system in the meantime to adopt the following suggestions:-

1. The time rate of wages (for each job) should in all cases be paid.
2. Overtime and nightshifts to be paid on the same conditions as already prevail in each workshop.
3. A time limit, after it has been established, should only be changed if the method or means of manufacture are changed.
4. No firm should establish the bonus system without intending to adhere to it."(1)

The Agreement also provided that times should be fixed so as to allow men of average ability to earn time and a third, and gave a guarantee that men would not be dismissed merely for exceeding time allowances. The

(1) Memorandum of decision in Central Conference between the Executive of the Engineering Employers' Federation and the Executive Council of the Amalgamated Society of Engineers, held at Carlisle, 19th. to 20th. August 1902.

The Agreement gained the approval of Lord Passfield, who "believed the system to be a good one for trade unionism". He would have preferred a piece-work price-list system, but felt that neither employers nor workers were ready for such an institution, and the existing piece-work systems were very unfavourable to the workers. "Under these circumstances" he concluded, "the premium-bonus system, as provisionally agreed to, seems to be an admirable expedient. The Amalgamated Society of Engineers may safely agree to it."⁽¹⁾ Largely on the basis of this recommendation, and that of Mr. G.N. Barnes, the membership of the union ultimately ratified the agreement.

Unfortunately, the advice of the Employers' Federation was not binding upon any individual firm and the safeguards proved to be very inadequate, and were frequently ignored. Although the union was committed to the system there were strikes against it, and many trade unionists refused to work under it. This opposition increased until in 1909 the Trades Union Congress officially condemned the premium-bonus system. The Congress of that year was held in Nottingham, and the following formal resolution was carried unanimously: "This Congress strongly condemns the modern method of increasing output by the introduction of the premium-bonus system of working, regarding it as utterly opposed to the principles of trade unionism inasmuch as it creates a form of sweated labour, and acts as a factor in

(1) Letter to the "Engineers' Monthly Journal" of October, 1902.

increasing the number of unemployed, and hereby recommends that societies should use every effort to stop the further development of the system, also to take steps to abolish it wherever it has been introduced."

Following upon this resolution the Parliamentary Committee of the Trades Union Congress called a conference of societies concerned, and this conference appointed a Committee of Enquiry which collected information regarding the working of the premium-bonus system. This Committee was "of the opinion that the premium-bonus system, by encouraging individual selfishness, is demoralising to the workman. That, by destroying craftsmanship and encouraging specialisation it is harmful to the industry." The Committee concluded that although the system was in fact being more and more widely used, practically all those who had had experience of it condemned it because it tended to destroy trade unionism and collective bargaining, caused unemployment, led to deterioration in the quality of workmanship, and fostered ill-feeling in the workshop.

No united action was, however, taken to abolish the system, although individual organisations resisted it. It continued to spread, and during the War of 1914-18 its extension was to some extent accelerated. The trade union attitude has, however, generally remained unalterably opposed to the system, and it is today a method of declining importance in the majority of industries. The straight piece-work system gives a much more powerful incentive, and

avoids the dissatisfaction caused by the sharing of the time saved with the employer. It is much more readily accepted by the majority of workers, and has the support of the trade unions. With the development of modern techniques of rate-fixing, such as time and motion study, the danger of loose rate-fixing is much reduced, and likewise the tendency to rate-cutting. Thus the prime raison d'etre of the premium-bonus system has to some extent disappeared, and it finds little favour nowadays with either employers or employees in this country.

American
Practice:
Emerson.

In America, however, these "sharing plans" as they are called have a very wide acceptance, and there is a multitude of different systems each with its own peculiarities and claiming its own advantages. Some of the better-known are the Diemer, Baum, Barth and Emerson. Discussion of these purely American system is outside the scope of this thesis, which is concerned only with British practice, but the latter has been adapted by a number of British firms and so it merits mention. It is based on an efficiency computation; a time is determined for the particular job, and the worker who is able to complete it in this time is regarded as 100 per cent efficient. On either side of this point, above and below it, a calculation of the worker's efficiency is made, and a corresponding bonus paid in accordance with an empiric scale set up by the author of the plan. 66 per cent

efficiency is regarded as the basis, and anyone below this level is regarded as sub-normal and liable to be transferred to some more suitable work or to be dismissed. At 67 per cent efficiency a small bonus (a percentage of the time-wage for the hours worked) becomes payable, and this bonus increases rapidly to 10 per cent at an efficiency rate of 90 per cent. For every additional one per cent gain in efficiency thereafter, a bonus of one per cent is paid, so that at 100 per cent efficiency, the bonus is 20 per cent.⁽¹⁾

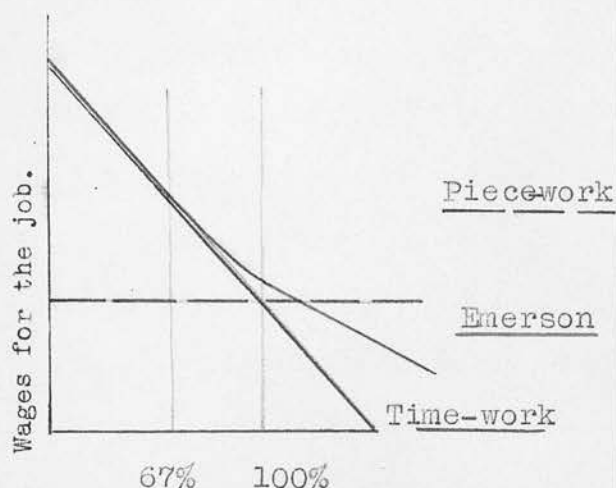
A small bonus becomes payable, therefore, below the standard performance, and there is a gradual transition from the guaranteed day-rate to the piece-rate, as performance improves. The smooth transition is secured by basing the bonus on the parabolic curve. If the worker is less than 67 per cent efficient, he receives merely his time-wage; if he is between 67 and 100 per cent efficient, he receives the wage for the time taken, plus a certain percentage bonus on that time taken. If he is over 100 per cent efficient, the worker is paid:-

$$\left\{ \begin{array}{l} \text{Wages of} \\ \text{Time taken} \end{array} \right\} \text{ plus } \left\{ \begin{array}{l} \text{Wages of} \\ \text{Time saved} \end{array} \right\} \text{ plus } \left\{ \begin{array}{l} \text{Certain bonus \% of} \\ \text{Wages of time taken.} \end{array} \right.$$

It is important to notice that the Emerson bonus is based on the time taken, a constantly diminishing amount as efficiency increases. Hence the downward slope of the piece-rate curve, thus:

(1) For full bonus scale, vide Appendix "C" (5).

Instead of the horizontal line of the straight piece-work system, under the Emerson plan the piece-rate falls gradually as output goes up. This is somewhat similar to the position found in the Halsey and Rowan systems of premium-bonus, and leads to the same sort of criticism from workers, who contend that they should receive the full benefit of the time which they save.



The efficiency percentage is calculated as the ratio between task time and time actually taken, and the average is struck over a period of a month, or at least a week, in order to smooth out fluctuations. If during a 40 hour week a worker completes jobs whose task time totals 30 hours, his efficiency will be:- $\frac{30}{40} \times 100$, i.e. 75 per cent., and this will give him his weekly wage (say 100 shillings) plus a bonus of 1.31 per cent., i.e. a total of £5.1.4d.

Harrington Emerson repeatedly claimed that the employee receives the full benefit of the time which he saves, and in a sense this is true in that for every piece produced he receives the full task time, however short the

time actually taken. Under straight piece-work, however, the worker not only receives the "task time" as it were, but also a constant addition to this (usually 25 to 33 per cent), whereas under the Emerson plan the bonus declines with increasing output, since it is calculated upon a constantly diminishing figure, viz. time taken.

As the bonus begins well before full efficiency is reached, however, the Emerson plan is beneficial to those just learning a job, and may serve to encourage beginners to increase their proficiency. The early bonuses are, however, very small, and the fact that there is no sudden increase in bonus at the task level removes a powerful incentive to reach that point. Then there is the fundamental defect of the diminishing piece-rate above task, which greatly detracts from the incentive value.

British
example.

However, a number of firms in this country have adopted modifications of the Emerson plan. One English manufacturing company, employing over two thousand workers, has a scheme based on the Emerson technique. Jobs are scientifically time-studied in order to establish task times, and job analysis is used to set base-rates. Bonus begins after 80 per cent efficiency, and rises steadily to 25 per cent bonus at 100 per cent efficiency, thus:-

Efficiency:	80%	Bonus:	Nil
"	90%	"	12½%
"	100%	"	25%
"	120%	"	50% and so on.

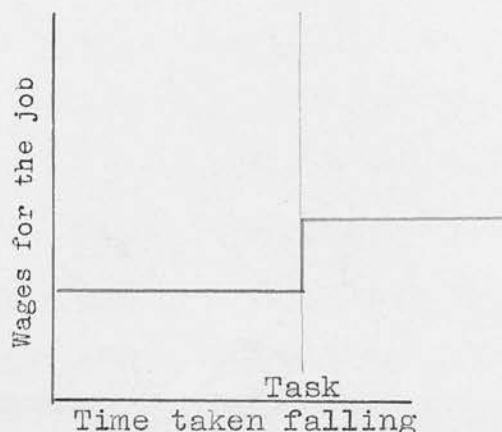
The firm claims that the scheme has been very successful in achieving economies in unit cost of production. It has been well received by the majority of the workers, and is considered to have been the means of retaining workers who might otherwise have been attracted to some other firm which paid higher wages. The management hesitated to say, however, that the scheme had been the means of promoting good employee relationships, although it formed part of a wage agreement with the National Union of General and Municipal Workers.

Taylor's
Differential
Piece-rate.

The objection to the falling piece-rate with increasing output is so fundamental, and so utterly alien to the simple psychology of incentives that plans have been devised which employ precisely the opposite principle, viz. a piece-rate which rises with increasing output. This takes cognisance of the dual principle discussed above, namely (i) that the law of diminishing marginal utility applies to income as well as to other commodities, and (ii) that after a certain point every increase in output necessitates a more than proportionate increase in effort on the part of the worker.

F.W. Taylor, the American pioneer of Scientific Management, incorporated this principle in his "differential piece-rate plan". This was based on his experiments with time and motion study by which methods he sought to determine what constituted a reasonable day's work. Having fixed upon the standard rate of output, he proposed that this, and any excess over the standard should be paid for at a

substantially higher rate (50% higher) than output below the standard. He offered a generous reward for output at and above the task level, but severe punishment for those who failed to come up to standard. Taylor himself suggested that "the lower differential rate should be fixed at a figure which will allow the workman to earn scarcely an ordinary day's pay when he falls off from his maximum pace, so as to give him every inducement to work hard and well."⁽¹⁾ In this system there is no guaranteed minimum wage, and instead of a gradual progression towards the task level, as in the Emerson plan, the task level is very clearly indicated by a substantial step up in the wages line thus:-



This means that if an employee makes task level on Monday, and only just fails to do so by a few minutes on Tuesday, his wages for the two days will differ by over 50 per cent.

Thus the system is extremely rigorous, devised with the deliberate

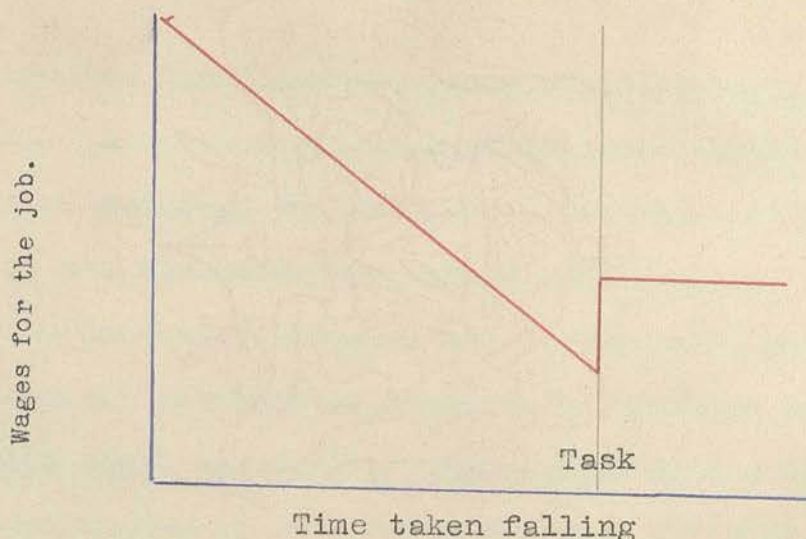
(1) "A Piece Rate System", American Society of Mechanical Engineers, June 1895.

purpose of singling out sub-normal workers, and keeping only the best workers in the plant. It requires completely standardised conditions of work, methods and equipment, so as to ensure that the performance of the task in the allotted time is regularly possible for any first class worker. It is only practicable where long runs of the same operation are undertaken so that workers can be kept on the same job for a considerable period and are able to settle down into a good rhythm of work.

Gantt: Task
plus bonus.

It can hardly be denied that Taylor's system does offer a very strong incentive to reach high standards of performance, but it was so rigorous that those employers who used it were in constant conflict with their men. Among the major points of conflict was the unfairness of the system to the worker who failed to come up to standard, and the new worker just learning the job, neither of whom had even the guarantee of his basic time-rate.

An associate of Taylor, by name H.L. Gantt, sought to overcome this objection by introducing the "Manchester guarantee" of the basic time-rate for performance below task. It is similar to the straight piece-work system with guaranteed minimum, except that the transition from the time-rate line to the piece-rate line is by a high step bonus, thus:-



Time-study is used to determine the standard or task time, and the worker who makes the task is paid a bonus on the task time; the worker who fails to make the task is guaranteed his ordinary time-rate for the time which he takes, and in some cases he may even be paid a proportion of the bonus if he just fails to complete the job in the time allowed. Thus, the Gantt system represents (a) a time-rate system for workers of less than the standard efficiency, and (b) a piece-rate system for workers of standard or more than standard efficiency. The bonus varies between 20 and 100 per cent, but it is always based on the standard time, not the time taken, as in the Emerson plan; hence the horizontal wages line above task level. The worker who fails to make the task receives merely his time-wage, but if he does the job in the standard time or less, his wage is:-

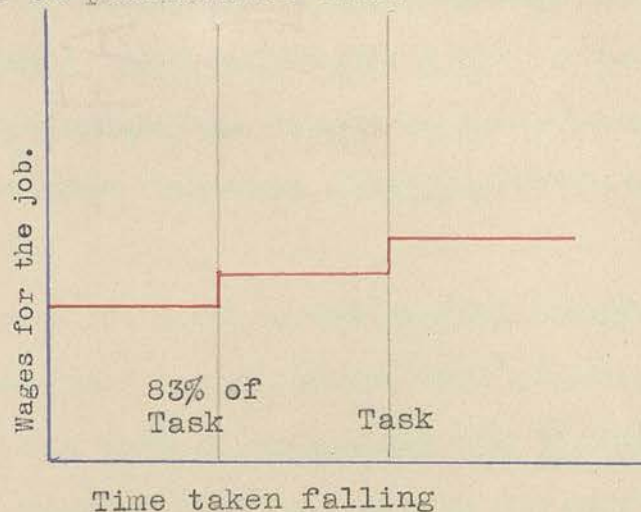
Task time x Rate per hour plus % Bonus on Task time.

As in the Taylor plan, the advantage of reaching the standard performance is emphasised by the substantial bonus,

so that the incentive power of the system is strong.

Merrick
Multiple
Piece-rate.

Another adaptation of Taylor's system was that of D.V. Merrick, who introduced his multiple piece-rate plan in the Winchester Repeating Arms Company. He appreciated the incentive value of the differential piece-rate, and thought it might be improved by breaking up the one large step into two smaller steps, thus giving some measure of encouragement to workers who were striving to reach the standard level of performance thus:-



Merrick suggested giving the first bonus (of 10 per cent) at 83 per cent of the task level, and a further 10 per cent at task.

Thus there are evolved three piece-rates, each higher than the last, and this necessarily involves rising labour cost per unit of output as output increases. It can, however, be arranged that the steps are such that the extra labour cost involved is more than offset by the reduction in overheads, and the added incentive power of this multiple piece-rate system as compared with straight piece-

work is of great value both in encouraging the less efficient workers, and in keeping the efficient ones "on their toes".

British Practice.

Merrick's plan has been combined with Gantt's and adopted quite frequently in British plants where a constantly expanding output is desired. The psychological effect of the multiple piece-rate system was recognised by Mr. C.A. Mace⁽¹⁾ when summing up the results of his experimental studies on incentives: he said that multiple piece-rates would "perform something of the psychological functions of handicaps and bogeys in games of skill with, of course, the added interest which the different standards would entail."

Carpet Manufacture.

A well-known firm of carpet and rug manufacturers in England employs this method in its Woollen Spinning Department. The unit of production for "doubling and reeling" is a pack of 240 lbs., and it is known that a good worker can do about eight packs in a week. The piece-rate per pack up to six packs per week is 10/6d; for the next two packs per week per worker the piece-rate is 11/- per pack; for the next two 11/6d. and so on. After nearly two years working, the system has been found to have undoubtedly stimulated production and resulted in less absenteeism.

(1) "Incentives - Some Experimental Studies"; Industrial Health Research Board Report No. 72, 1935, H.M.S.O.

Chocolate
Manufacture.

A Scottish chocolate manufacturer has a similar scheme in some productive departments. Piece-rates are fixed by time-study, the figures being agreed with the shop-stewards. and if output exceeds the target figure higher piece-rates come into operation. The scheme has the general acceptance of the staff, and it is considered that it has contributed substantially towards increasing output. The same piece-work bonuses are paid for workers on the same job, irrespective of what their base-rates may be. This encourages the younger members of the staff whose base-rates are lower than those of the older girls.

There is no doubt that the multiple piece-rate plan is psychologically sound. It provides the greatest possible incentive to increase output; the worker has all the benefit of the time he saves; and due regard is paid to the diminishing marginal utility of income and to the fact that every increase in output after a certain point demands progressively more effort. If the demand for the manufactured commodity is elastic, so that a small reduction in price results in a more than proportionate increase in demand, it is particularly profitable for the manufacturer to increase his output even if costs fall only slightly. In these circumstances the rising labour costs per unit involved in the multiple piece-rate system, so long as they are compensated by a fall in unit overheads, will not be a handicap, and the system will be that most likely to succeed in stimulating the

desired increase in output. The practicability of employing this method might profitably be explored by many more manufacturers in these days when an increase in production per man-hour is so vital to the national well-being.

C H A P T E R XIII.POINT PREMIUM SYSTEMS.

In the 1930's a new name - Bedaux - came on the industrial scene, and was heard all too frequently in connection with strikes and labour troubles. The Bedaux system of wage payment was introduced into Great Britain in 1924 by a London photographic works which imported it from its parent company in the United States. The method achieved considerable vogue in America, being adopted by important firms such as Libby, Swift, Jantzen, and so on, and was taken up by a large number of European firms including Fiat and Pirelli in Italy, and Glantzstoff-Courtaulds in Germany. Following its introduction into this country it spread fairly rapidly so that within ten years well over two hundred companies⁽¹⁾ were employing the system, including factories manufacturing ball bearings, paper and metal boxes, confectionery, cameras, chemicals, textiles, fertilizers, hardware, tyres, furniture, toilet preparations, and a host of other products.

So much acrimony has been associated with the name of Bedaux, however, that nowadays many firms will not admit that they employ the system, although closer investigation reveals that the method which they use is fundamentally based on the Bedaux plan. Other American systems, such as the Haynes Manitt and the Dyer methods, are similar in principle to Bedaux, and the latter may be taken as typical

(1)"Manchester Guardian Commercial" 10th. June, 1933.

of a large selection of plans which can be grouped under the title of "point premium systems".

Problems of
Time- and piece-
work.

The disadvantages associated with the time-rate and piece-work systems have been fully discussed above, and it was the intention of Charles E. Bedaux, a French-American, to produce a wage incentive method which would embody the advantages of both time and piece-work and yet avoid their disadvantages. The great advantage of the time-rate system is its simplicity - hours worked x rate per hour = wage. But, as the late Professor John Hilton pointed out in a broadcast talk in 1933, the modern method of collective bargaining fixes the wage level, that is "the amount of money for the work, but not the amount of work for the money." The purpose of the piece-work system is to fix the "amount of work for the money" and to provide that which the time-rate system so sadly lacks, an incentive to greater effort. Unfortunately the introduction of piece-work brings in its wake a host of problems connected with rate-fixing because of the difficulty of putting an accurate cash value on human effort.

Origins of
Bedaux.

In 1911 Charles E. Bedaux "became impressed by the need of a means of measurement that would render it possible to set quantitative values on human physical effort."⁽¹⁾ He realised that if there could be found a method of determining what really did represent a proper output per

(1) Booklet "Bedaux Measures Labour" published by Charles E. Bedaux Ltd.

hour, then, so long as there was a guarantee of this output, the time-rate system - with all its advantages of simplicity - would operate quite satisfactorily. "The employer would know that he was getting 60 minutes' worth of work for one hour's pay, and the worker would know he was getting one hour's pay for 60 minutes' worth of work."⁽¹⁾ Professor Hilton's difficulty would thus be resolved and this was what Bedaux set out to do.

Finding a Unit of Work.

The primary fundamental in such a quest was clearly the discovery of some standard of work measurement, corresponding to the pound, the yard or the acre, and for a period of five years Bedaux engaged in research along this line. Although the various kinds of work in which humankind engages are so many and widely different, there are three factors which are common to all, namely effort, relaxation and time. The Bedaux system is "based upon the principle that all human effort may be measured in terms of a common unit, that unit being made up of a combination of work and rest, with the proportions dependent upon the nature of the effort and the subsequent relaxation required to compensate for it. As tasks vary, the ratio of work to rest within the unit varies, but the unit itself remains constant."⁽²⁾

Effort

To deal with the first common factor - effort - a standard has to be established by which various types and

(1) Paper by Mr. P.K. Standring read before the Manchester Branch of the British Works Management Association on 14th. February 1934. Reprinted in "Industry Illustrated" in May and June 1934.

(2) Bedaux: "Bedaux Measures Labour".

intensities of effort may be compared. The standard of effort which Bedaux set up as normal was the effort expended by a man walking about on level ground at three miles per hour, and he claimed to be able to express any other kind of effort in terms of this standard. This standard effort is called, for convenience, 60, and the Bedaux engineers were trained to rate the effort expended by the worker in performing the task under review on this basis. If a man was expending effort one-third greater than the standard (walking on level ground at three miles an hour) he would be rated at 80, and so on.

Rest

Relaxation is, however, essential in any kind of work, the amount varying according to the needs of the job, and Bedaux built up, between 1911 and 1916, what he called his "relaxation curve". He believed that "man should be considered as a force renewed by rest, food, and thought; that the force is spent in certain elementary performances, lifting, pulling, pushing, pressing, and that the nature of a movement and the frequency of its repetition determine the amount by which the force is drawn upon. The result of these beliefs was an attempt to determine the elementary motions employed by man in working, and the rest periods related to them, so that the values ascertained could be used as a basis in all time-study work." (1) Bedaux formulated a number of "laws" of effort and relaxation, and embodied them in his "relaxation curve"

(1) Article in the "American Machinist" of 16th. February 1922, by the Managing Editor, Mr. L. C. Morrow.

which took account of such factors as weight handled, rapidity of motion, pressure applied, length of cycle, strain, etc., and shewed "the rest or relaxation times that should be considered as necessary to offset working times,"(1) for various types of work.

Bedaux Unit.

The introduction of the third element - time - enabled Bedaux to fix upon his unit of work: "the amount of work a normal man can do in one minute when working at ordinary speed in ordinary conditions and availing himself of his full measure of relaxation." This unit is known as a "B" and it is a "fraction of a minute of work plus a fraction of a minute of rest, always aggregating unity, but varying in proportions according to the nature of the strain."(2) Thus the three common elements of effort, relaxation and time are all embodied in the unit, which becomes a "yardstick" by which the work of mechanics and labourers, men and women, direct and indirect workers, is all reduced to a common denominator.

How Bedaux Works.

The Bedaux system seeks to equate work and wages, and in order to do this, two factors must be recognised, viz. (a) the amount of skill, experience and responsibility required; and (b) the amount of effort expended. The first factor affects the base rate payable for any particular type of work, and it involves job analysis along the lines already discussed in the section on piece-work.

Bedaux base rate analysis attempts to relate the basic

(1) Morrow: Ibid.

(2) Bedaux: Ibid.

hourly rate of pay to the requirements of the job, by analysing those requirements and comparing them with those of other jobs. The fixation of base rates is, of course, circumscribed by the existence of trade union rates of pay negotiated by collective bargaining, so far as the organised trades are concerned.

Time-study.

The usual methods of time-study are employed, but the technique of "rating"⁽¹⁾ is given a place of paramount importance. The Bedaux engineer not only times the job, but also assesses the effort which the worker is expending in terms of the standard of walking at three miles an hour on level ground. In addition, the question of relaxation receives attention, and the Bedaux engineers, using the relaxation curve, make an appropriate allowance for rest, varying with the nature of the job.

Take the case of an operative who is found on time-study to be doing job A in exactly two minutes. The engineer rates the effort expended by this worker at 80, that is, one-third greater than walking at three miles per hour on level ground. If the worker, working at an 80 rate does the job in 120 seconds, then clearly if he worked at the standard (60) rate, he would take 160 seconds. An addition to this time must be made for relaxation, and, assuming that the appropriate relaxation allowance is, say, $12\frac{1}{2}$ per cent., then the standard time for this particular job A would be: 160 plus 20 = 180 seconds.

(1) Vide supra: section on "Rate-fixing" (Chapter XI).

Thus, the B-rating for the job would be 3-B (180 seconds = three minutes of normal effort and relaxation). A number of these time-studies would be taken on different workers, and a mean struck before the final B-rating was decided upon.

Process
Allowance

In certain processes the worker has not complete control over his output, for the nature of the work demands that he work more slowly than he would otherwise do. It would be unfair for him to be penalised on this account, so there is provided what is called a "process allowance". It is generally claimed that a man can work steadily at an 80 rate, rather than the standard 60, so he is paid for the work he does at an 80 rate, and the balance is paid for at base-rate and is called the process allowance. For example, imagine a worker who is required to perform operation X, which is rated at 10-Bs, on the chassis of a motor car. The cars come along the conveyor belt at the rate of four per hour, so that for that worker there are only 40-Bs of work to be done each hour, and he is therefore unable to complete his quota of 60-Bs per hour. Assuming that he works at an 80 rate, the 40-Bs of work would occupy half-an-hour, and the remaining half-hour would be paid at base-rate, and regarded as process allowance. Thus this man would be credited with 70-Bs for his hour's work.

Lost time

A similar arrangement operates in the case of time

lost through breakdowns or shortages which are outside the control of the operative. For every minute lost in this way the worker receives a credit of one B, so that he is not penalised unjustly.

Totalling
the Credits.

The number of Bs allocated to each job, together with any process allowance which may apply, is posted on the notice-boards. Each worker keeps a time-sheet, recording the jobs done each day, and at the end of the day the total of Bs credited to him for jobs done, process allowance, and lost time, will be easily calculated. The standard output is 60-Bs per hour, that is 480 for an 8-hour day, but the standard is such that the average man will accumulate 75 to 80 credits per hour, and a highly skilled man will do even better. Bedaux is a wage-incentive system, and additional pay is given for additional effort above the standard. Any Bs in excess of 60 per hour are termed "premium Bs", and their money value is equal to the base-rate divided by 60. The Bedaux system is a sharing plan, and the worker does not receive the full benefit of the time he saves. 75 per cent of the premium goes to the worker, and the remaining 25 per cent is put to a premium reserve out of which the premiums payable to supervisors and indirect workers are met. This division is justified on the grounds that the direct workers must have the co-operation of supervisors and indirect workers if they are to produce the high B-hours which give them a bonus. These supervisors and indirect workers receive their appropriate

base-rate, and premium based either on their own B-credits, or, if the performance of the direct workers depends largely upon them, their premiums may be calculated on the basis of the average B-hour of the department served. The efficiency of the department and its individual workers is indicated on the daily posting sheet which appears on the notice-board and shews the number of Bs produced by each worker during the previous day, the resulting B-hour, and the amount of premium earned. In this way interest is maintained, and a competitive spirit aroused between individual workers and departments of the organisation.

Advantages
Claimed.

This, in outline, is the Bedaux system; what of its merits and demerits? One large English woollen firm reported that in the first year after changing over from a piece-work system which they considered efficient to the Bedaux method, costs fell by 30 per cent., and operators' earnings rose by 15 per cent. as the result of increased production per operator per hour. This initial success encouraged the firm to extend the system to four other of its plants, and it has been found to offer substantial advantages over piece-work. It has given the management a production control which they did not have before, in as much as operators are expected to come up to a set standard per hour or per day, and this has reduced the need for supervision. Bedaux has also given them a very accurate costing system which they consider

invaluable.

Another firm, manufacturing paint in the Midlands, introduced Bedaux into its plant and was able to change over from a 47-hour week to a 40-hour week; wages rose by 25 per cent, costs were cut, and trade increased. The chairman said: "It is really simple". The work is not harder, but it is so organised that every man is now working sixty minutes every hour - and not only fifty minutes an hour as in the old easy-going days."

In a survey of twenty-nine plants operating the Bedaux system, it was found that on an average labour costs fell by 30 per cent; operator productivity increased by 78 per cent; and operators' earnings rose by 17 per cent.⁽¹⁾ The maximum reduction in labour cost was 57 per cent, in a firm of 500 employees, manufacturing teleprinters and transmitting and receiving apparatus. The best figures for productivity were found in a factory of 600 employees manufacturing paint, varnish and printing ink; operator productivity in this plant rose by 176 per cent. 27 per cent was the maximum for increases in operators' earnings - this was achieved in a firm of soap, perfume and toilet manufacturers, also with 600 employees. It is claimed that these improvements have come about because of what Bedaux calls "unused capacity to produce". He says: "It is not uncommon to find well-managed plants with well-organised facilities, and with labour working under some incentive

(1) Cyclostyled sheet issued by Chas. E. Bedaux, Ltd., dated 26th. January 1934, and entitled: "Analysis of Results of Typical Applications".

system, producing 45 to 50 Bs an hour. The difference between 50 Bs an hour and 80 Bs an hour represents unused capacity to produce, recognisable only when disclosed by actual measurement of the work involved.....The results of Bedaux applications in over 200 plants in different industries,...have been an increase in production of 44 per cent, accompanied by an average reduction in labour costs of 20 per cent, and an increase of labour earnings of 15 per cent."(1)

Production Control.

One of the most important advantages of the Bedaux system is its use in production control. This applies to any "points" system which reduces the various types of labour to a common denominator, whereby standards are created and performance measured. If a department has 100 employees working a 40 hour week, assuming that it is the norm for operators to work at an 80-rate, the department should produce 320,000 Bs during every week. However many jobs are done in that department; however many different products made; however many staff or process changes made; a production of 320,000 Bs may be expected, and if it does not materialise the fact is immediately revealed and can be investigated. This universal "yardstick" of efficiency, which can be applied to all parts of the productive organisation, is of great value as a management "tool".

Each employee has a daily time-card or checking-card upon which is registered each job done during the day. At

(1) "Bedaux Measures Labour" (Chas. E. Bedaux Ltd.)

the end of the day, the card is totalled for hours worked, machine time used, process allowance, lost time, etc., and the total number of Bs made is computed. This B-figure divided by the number of hours worked gives the B-hour averaged by the employee during the day. These figures are posted on a departmental posting sheet, the names of those averaging less than 60-B appearing in red. The weekly analysis sheet summarizes departmentally the posting sheet, and shews the total time and B-rate attained daily in the department. Each foreman is given a copy to enable him to check his department and visualise his own premium bonus. He can see at a glance which operators are efficient and which are not. This sheet also goes to the management, who can thus compare the efficiency of the departments. With this information available, the management can account for every minute of every man's time, so that if lost time or process allowance seems to be excessive, an investigation can be made with a view to improving methods or progress control. The analysis shews up immediately how much of a productive worker's time is taken up with waiting for materials, or fetching them or doing some other non-productive task, so that bottle-necks and hold-ups are revealed immediately and clearly.

As a method of production control, therefore, Bedaux gives valuable indices of (a) the labour efficiency of each department, (b) the comparative

efficiency ratios of each department, (c) the efficiency of the supervision, (d) the ratio of productive effort to total effort, (e) the ratio of indirect labour to direct labour, (f) departmental and total output, and so on. Bedaux's usefulness as a tool of production control is undoubtedly one of its greatest advantages.

Costing

Closely linked with production control is costing, and again in this sphere the advantage of having a common denominator - the B-unit - is evident. Standard cost per B is found by dividing the base or hourly rate by 60 (as there are 60 Bs per hour in the standard performance). This standard cost per B multiplied by the B-value of a job fixes that job's standard costs, which can then be compared with actual costs. Comparison of standard and actual cost enables discrepancies to be investigated and accounted for by the discovery of idle time, inefficient performance, unsuitable staffing, machine breakdowns, material shortages, correction of defective work, and so on.

The allocation of overhead costs, too, is facilitated. In the hypothetical case of the department of 100 employees working a 40 hour week, oncost per B is simply calculated by dividing the total oncost for the department by 320,000. This amount, multiplied by the B-value of any job, gives the appropriate figure of oncost for that particular operation. This method is more satisfactory than either the machine-hour or the man-hour system, for the B-output of the department can be adjusted to changes in machinery

or staff, and the allocation of oncost remain accurate and simply calculated.

Wage-changes.

An allied advantage is that the B unit is independent of changes in wage-levels. With ordinary piece-work prices, if there is a change in base-rates, the whole price-schedule has to be altered, involving perhaps thousands of calculations. Since the amount of work involved in a job remains unchanged unless the job itself is changed, its B-rating will be the same despite changes in wage-levels. If the base-rate is raised, the calculation of wages is not complicated, for it merely involves a change in the multiplier. This is the same advantage which was noticed in the case of the "standard times" system of expressing piece-work prices in terms of time rather than cash.

Disadvantages:

(a) Sharing of premium.

Turning to the disadvantages of the Bedaux system, the incentive power of the method merits attention.

Clearly, Bedaux suffers from the same disadvantage of Rowan, Halsey and the other "sharing plans" in that the worker does not receive the full benefit of the time he saves, and therefore has not the same incentive to increase his efforts.

It is usual for 75 per cent of the premium to go to the worker, and 25 per cent to indirect labour, including supervision. This was one of the points at issue in the strike which occurred in 1931-1932 in the Wolsey knitting plant at Leicester, and it was dealt with in the agreement⁽¹⁾ which followed the settlement of the strike thus:

(1) Vide Appendix "D" (1)

"Premium - Wolsey Ltd. agreed to give the direct worker 95 per cent of the premium earned, in place of the 75 per cent at present in operation. It was stressed, however, that in the interests of the workers it was essential that there should be team spirit, and that the indirect worker should have an inducement to give the direct operator good and efficient service. It was therefore agreed that the direct worker should give 5 per cent, of the premium earned, to which Wolsey Ltd. were prepared to contribute a further 5 per cent in order to maintain the team spirit."

This means that the foreman's bonus depends upon the average B-hour of his department, and it would seem to be an incentive to an undesirable form of supervision, tending to "driving" rather than organising and leading. As a leading American trade union leader has said: "The prospect of this premium designedly spurs each foreman to concentrate on speeding-up slow or backward workers with a view to increasing their daily effectiveness. A humorous aspect is given to this arrangement by the fact that the foreman's premium is a deduction from the premium earned by all the workmen in his department."⁽¹⁾ A well-known rubber company, when it installed the Bedaux system, tried to avoid this difficulty by paying the supervisory premiums out of the firm's funds without affecting the wages of direct labour. The amount of premium paid was based on the premium B-s developed in the department, however, so that the incentive to "drive" would seem to be still present.
(1) Vide next page.

The objection to sharing the premium would undoubtedly be much less strong if it were shared only with indirect labour as distinct from the supervision. This was the view of a large engineering firm which changed over from piece-work to Bedaux "because of the psychological appeal...that indirect workers share d in the rewards of increased production at a standard cost. Here we saw an aid for overcoming the defects of human effort through co-operation. We hoped, for instance, that if for any reason material was not moving from operation to operation fast enough, the indirect worker...would see that for him it meant decreased wages in that he would not share because increased production was not forthcoming, and he would complain loud enough so that management would become interested." It can hardly be denied that it is desirable to link the interests of the direct and indirect workers, but if the latter term is extended to cover supervision, the dangers would seem to outweigh the likely gains.

(b) Rating. Some little doubt has already been expressed above in connection with the time-study practice known as "rating" whereby the time-study engineer not only times the operator on the job but also assesses the speed at which he is working. Bedaux goes even further than this and claims to be much more scientific in that long experience and

(1) Previous page: Mr. Godfrey C. Brown (Consulting Engineer to the American Federation of Labour), quoted by P. Glading in "How Bedaux works" (Labour Research Department) July 1932.

intensive research have given a basis upon which an accurate measurement can be made of effort involved, and the appropriate relaxation time required. As Dr. Northcott has claimed, however, this "ranking is arbitrary, not scientific; it is an estimate, not a measurement", and he goes on "Even though it be true that the rest and relaxation curve has a scientific basis, this estimate of the rate of effort which is quite without scientific quality is so significant a factor in the compilation of a 60 B point standard as to deprive the result of any special claim to scientific value."⁽¹⁾ In the course of the present investigation, special inquiry has been made of many time-study engineers on this question of rating, and whilst they are almost unanimous in their claim to be able to rate an operator accurately, they are extremely vague as to their methods and the scientific basis of their claim. Terms such as "informed judgment", "long experience", "careful estimate", and so on occurred with great frequency, and there is little doubt that rating - and most certainly Bedaux's more elaborate labour measurement - can never be anything more than an educated guess.

A more accurate timing could be obtained by taking a sufficiently large number of studies to iron out irregularities and give the natural time for the job.

(1) Article by Dr. C.H. Northcott "The Bedaux System - A Critical Appraisal" in "Unity", May 1932.

For example, a large firm of electrical manufacturers in the North of England, conscious of the difficulty, if not impossibility, of accurate rating, abandoned the practice in favour of a system of averaging. Appendix "D" (2) shews the results of ten separate time studies of the same operator, and also the results of ten time studies of ten different operators all performing the same operation. The wide variations are apparent, and it was found to be very difficult, if not impossible, for ten different rate-fixers, timing each of the operators, to "level" them to an average operator efficiency by the rating technique. It was therefore decided that for each element of a job, there should be taken ten studies on each of ten different operators, (1) giving a total of one hundred readings. The time which was to be made the base-time was selected by what is termed the "thirty per cent method", which consists of accepting the first timing which occurs three times, as the selected value. The ten selected timings are then treated in the same manner and the finally selected timing becomes the basic time for that particular element. It is emphasised that this method gives, not the average time for performing the element, but the operators' "natural time", i.e. that which corresponds to their natural rhythm of work. An average may include widely fluctuating times, some quite abnormal, and these will adversely affect the value of the final average. The usual allowance

(1) Vide Appendix "D" (3).

are made in addition to this basic time, for fatigue, personal needs, and so on, and each of these allowances is decided upon only after protracted time studies made on a wide range of operators over a long period of time.

- (c) Fatigue. One of the most frequently heard criticisms of the Bedaux system is that it gives rise to over-speeding and consequent fatigue. (1) For example, one union pronouncement declared: "When this scheme was first explained to us one of the points in its favour did seem to us to be the acknowledgement by Bedaux that no operator could be expected to continuously perform an operation without some allowance for rest and relaxation. We are more than sorry to find that the supposed relaxation is nothing but a myth, since in almost every case the operator is compelled by force of circumstances to absorb the whole of this allowance in order to attain her standard rating... (In making the time-studies) the engineer has stood with them the whole of the day, and with the exception of breaks for meals the girls have invariably worked continuously the whole day through. We cannot accept this as a natural effort, since no operator could continually work under such pressure, and when girls have under such conditions only produced just over a 60B hour then we feel there is just cause to offer criticism.... The same evidence is submitted from all sources to the
- (1) "Report on the Bedaux System of Labour Measurement" by the Executive Committee of the Leicester Hosiery Union, 1932.

effect that the system has had such a speeding up effect as to render it almost impossible for the operator to work with any degree of comfort." Certainly the Bedaux system displays a complete ignorance of the normal output curves and the principles of rest pauses, in that the allowances for relaxation are given as fractions of a minute, and the operatives are meant to take their rest pauses in this way, i.e. continuously throughout the working day.

The National Institute of Industrial Psychology⁽¹⁾ undertook a brief investigation into the effect of Bedaux on fatigue, in the Brunswick Mill of the Lancashire Cotton Corporation Ltd. Although the investigation was short - a period of ten weeks, with a holiday break intervening - the results are valuable as being the work of a scientific and impartial body. The conclusions of the investigators were: "There is no general evidence of undue fatigue, although isolated cases of abnormal fatigue have appeared from time to time. There is evidence of some factor affecting the pulse-product, but this alone does not provide conclusive proof of undue fatigue. Analysis of the sickness rate discloses no

(1) Investigation conducted under the joint auspices of the Lancashire Cotton Corporation, and the Manchester, Salford and District Weavers, Winders and Doublers' Association. Results quoted in the "Report on the Bedaux and Kindred Systems" presented to the Management Committee of the General Federation of Trade Unions, in March 1932.

(2) Vide page 231.

conclusive evidence of undue fatigue for the period reviewed. The Bedaux system was inaugurated on the 16th. June. After ten weeks' experience...33 per cent of the operatives stated that they felt more tired than they did under the previous system. This percentage rose to 37 at the end of twelve weeks. The percentage of operatives feeling more bored under the Bedaux system was 57 per cent after ten weeks' experience, and 55 per cent after twelve weeks. There has been....a rise in the pulse product for the group under observation. This rise has been more rapid than the increase in B-hours recorded, indicating an increasingly greater expenditure of energy in the effort to maintain or to increase production." These results would seem to indicate a situation akin to that of the blend-pullers investigated by H. Vernon in 1928.⁽¹⁾ When a new incentive scheme is introduced, there is almost invariably a spurt in production which may result in fatigue, but when the transition period has passed operators usually settle down at a pace which is well within their capacity and which does not involve them in undue strain.

Cost.

Two undoubted disadvantages of the Bedaux system are its costliness and complexity. As qualified and highly paid engineers have to be employed for some considerable time, the cost of installing the system is high, but this criticism is not valid if production is sufficiently

(1) Vide supra, Chapter VI.

thirteen of 2

stimulated, for then the returns exceed the outlay. For example, one firm claimed: "We ran a separate ledger at the time of the installation, and in it was placed the charges of the installation and the account was credited with the difference in cost of points produced. We began to give credits to the account at the end of eight weeks and the ledger shewed a credit balance departmentally at the end of ten months. In other words the installation was paying for itself within a year's time."

Complexity.

The system is difficult for operatives to understand, and this complexity tends to detract from its incentive value. It is practically impossible for the ordinary worker to calculate the amount of bonus due to him at the end of the week, and in some cases a trade union representative has been specially trained to check the figures on behalf of the workers concerned. Without this protection, the worker has to rely on the management to deal fairly and honestly with him, and this position is not readily acceptable to the majority of employees.

Trade Union Attitude.

The following resolution was passed at the Newcastle Trades Union Congress in 1932: "That we instruct the General Council of the T.U.C. to institute an inquiry into the Bedaux System of labour measurement, and to report their findings to affiliated societies at the earliest opportunity.⁽¹⁾" As a result of this decision a questionnaire was sent out, to which a hundred and four trade unions replied. Only

(1) Moved by the Operative Bleachers, Dyers and Finishers Assocn.

thirteen of these had had any experience of Bedaux, and in five of these cases attempts to introduce the system had been successfully resisted. In almost every other case the trade unions had opposed the system and had been successful in securing modifications and guarantees which protected their members against its harsher demands. The unions objections are mainly threefold: (a) to the sharing of the time saved with the employer; it is felt that the worker is not receiving all the fruits of his increased effort; (b) to the complexity of the system whereby it is virtually impossible for the ordinary worker to check the bonus payable to him; and (c) "Over and above all this is the feeling that the human element is being mechanised; that pride of craftsmanship, quality of work, and even health and comfort, are being sacrificed to speed of production." (1)

The Wolsey strike.

One of the best-known strikes in connection with the Bedaux system is that which occurred in the hosiery works of Messrs. Wolsey Ltd., of Leicester, and which lasted for a period of eight weeks. The firm was determined to introduce Bedaux, and the Hosiery Union was equally determined to oppose it, but at length the strike was brought to an end as the result of an agreement (2) following joint conferences presided over by the Lord

(1) "The T.U.C. Examines the Bedaux System of Payment by Results" (1933) p.4.

(2) For text of agreement, vide Appendix "D"(1).

Mayor of Leicester and an officer of the Ministry of Labour. This agreement illustrates how the "points" systems, of which Bedaux is typical, may be adapted to British conditions. The agreement safeguards the workers' position and gives them increased earning capacity than before; they have the advantage over piece-work of the elimination of unpaid waiting time, and the protection of the minimum wage. Joint consultation in the fixing of rates, and the guarantee that sufficient studies will be taken to give a fair average reading, are steps in the right direction, and these concessions, together with the more generous division of the bonus, have done much to make the scheme acceptable to all concerned.

Examples.

In short, much depends upon the manner in which the system is administered; like any other method of payment, it can be used by unscrupulous employers as a tool of exploitation; on the other hand, reasonably applied, it can be an aid to greater efficiency and increased output. A Scottish biscuit manufacturer successfully operates its own adaptation of the Bedaux system without any hostility from the staff. Time study is carried out to ascertain the number of units of work which can be performed in an hour by a normal operative; the result is expressed numerically and is known as the Unit/Hour factor. This factor is set to give a normal operative 125 per cent of base pay. By dividing the actual number of units of work completed by an operative in a day by the Unit/Hour factor,

the number of hours which a normal operative would have taken to do the work is found; let this result be referred to as "x". The factor "x" can thus be multiplied by the base pay per hour for the job in order to arrive at the operative's earnings for the day; if the result is less than the base pay, the base-rate operates as a minimum. As an incentive, and also as a means of measuring the efficiency of the operative, the department and the factory, the factor "x" is expressed as a percentage of the hours actually employed. This percentage is known as the "working speed" and is posted in each department daily, shewing the results for each operator. The firm is a private limited company, with the traditions of a family business, and excellent relations exist between management and staff. Before the points system of wage payment was introduced the project was laid before the workers through the channels of joint consultation, and their approval and co-operation sought and secured. Every care is taken to ensure that the time-studies are conducted in fairness to the operators, the employee gets the benefit of all the time she saves, and as a consequence the scheme works smoothly and without hostility.

Heavy
Engineering.

In another very large engineering plant, engaged in the manufacture of tractors and earthmoving equipment, an adaptation of Bedaux operates successfully. Base rates are fixed by job evaluation methods, agreed with the trade

union, and above this level a points incentive system comes into operation. Standard units of work have been evolved, and time study is used to establish the unit-rating of each job. All the units produced by the worker over the standard are known as "pay units", and the employee receives compensation for such pay-units equal to $1/60$ th of his basic hourly rate. Thus again there is no sharing of the premium so that this bone of contention is removed. Direct and indirect workers and supervisors are all treated quite separately for incentive purposes. In the payment of indirect workers, the productivity of the direct workers is used as one of the factors which determine the amount of bonus paid. Bonus payments are made to foremen for savings resulting from operating efficiency in their departments, based on the total output of the department concerned.

Bonus becomes payable to the direct worker before he reaches the standard efficiency. If he produces 40 units in an hour, he is given 20 additional units as allowance; this is the break-even point between bonus and no-bonus earnings. If he produces 50 units in an hour, he is given 15 units as allowance; if he produces 60, an additional 10 are given; and so on until he produces 80 units in an hour, at which point no addition is made. At that point he earns thirty-three per cent. bonus on his basic hourly rate.

Road Motor Repairs.

Just prior to nationalisation, one of the main-line railway companies adopted a "points" system of bonus payment for the routine maintenance inspections of motor vehicles and trailers. A bonus of $33\frac{1}{3}$ rd. per cent was paid on

base rates for a specified output, with provision for an increase in the bonus proportionate to an increase in output above this specified figure. The work is measured in terms of man-hours per output unit (known as a "point") and, in effect, as the man-hours per point decrease the bonus increases. A standard time per output point is fixed, and this provides for all repairs necessary between the periodical inspections, e.g. running defects, repairs to bodywork, repair of accidental damage, etc. where such repairs do not necessitate large-scale operations. In view of the widely differing amount of work involved in dealing with the various types of vehicles and the various categories of inspections, the "A"(light) inspection of a trailer is used as the basis of value of an output point, and all other vehicles and inspections are valued in multiples of that unit, in accordance with a prepared schedule. In order to level out fluctuations from week to week, a four-weeks' running average is used for output points and man-hours.

Summary.

These three examples shew how points systems can be adapted to light, repetitive, mass-production operations, to heavy engineering, and to day-to-day repair work, and this adaptability is one of the method's greatest recommendations. It may be anticipated that more and more firms will adapt the points method to their own particular needs by establishing a unit of work suited to their requirements, and adding their own individual refinements. The Bedaux System, as such, has had its day; the name is

anathema in labour circles, and any firm which set out to introduce the system by name would almost certainly encounter hostility from the start. It must be admitted that the dogmatic claims of Bedaux to be able to calculate with scientific accuracy the effort involved in and the relaxation required for any job whatsoever, and to be able to reduce these variables to a common unit, cannot be substantiated. The calculation is nothing more than an estimate, an educated guess.

Apart from this fundamental criticism, Bedaux has given much that is of value to the knowledge of wage systems. The conceptions of process allowance and lost-time allowance are undoubtedly useful. The value of expressing piece-work prices (for this is what the B-ratings really amount to) in terms of points or units other than money is very great, particularly from the point of view of production control, costing, and adjustments following changes in base-rates. It would seem to be inadvisable to insist upon the sharing of the premium between management and labour; there is much to be said for the view that the operator is entitled to the full benefit of the time which he saves, so long as the time-studies for rate-fixing purposes have been accurately made. If these amendments are accepted, it will be seen that the system becomes virtually a piece-work system with guaranteed minimum, and the prices expressed in terms of "points" rather than cash, and fixed by means of accurate time-studies, with proper allowances for relaxation.

The "standard times" system⁽¹⁾ which is being widely adopted today operates along these lines, the points being "standard hours", and it would seem to be the most satisfactory individual system so far evolved.

(1) Vide supra.

CHAPTER XIV.GROUP INCENTIVES.

Payment-by-results implies remuneration based on output, but not necessarily the output of an individual; it may be the output of a group - a team, a department, or even a whole plant. This is no new development; indeed our modern piece-work systems grew out of the former practice of farming work out to a sub-contractor or piece-master who received payment for the work he produced; out of this lump sum, he in turn paid the men who worked for him, that is to say, the payment made by the manufacturer was in respect of the output, not of an individual, but of a group.

From this practice there developed the various individual systems of payment-by-results, but today the pendulum seems to be swinging back again, and group incentives are being widely adopted, for a number of reasons. In the first place, although the trade unions have very largely abandoned their opposition to the various piece-work systems, they still emphasise the principles of collective solidarity and no differentiation between individuals doing the same job. The unions have often argued that piece-work tended to set man against man, and to stimulate an undesirable, competitive spirit within the workshop. For this reason, they favour in many cases the collective piece-work systems, which give due weight to the trade union principle of collective solidarity. In the Scottish engineering

industry, for example, a number of cases came to light in which this collective spirit was so strong that employees working on an individual piece-work system pooled their piece-work bonuses as soon as they received their pay-packets, and redivided them among the members of the voluntary pool in some agreed proportion. This is sometimes known as a "fellowship pool" and is usually confined to the workers in a particular shop.

A further reason for the extension of the use of group incentives is that nowadays in many manufacturing processes the unit of production is the group rather than the individual, and it may be impossible to calculate the output of any one member of the group, though perfectly feasible to measure the output of the group as a whole. In a modern mass production plant, for example, each operator is largely dependent upon the other operators on his particular production line, and a steady work-flow with properly balanced output is much more important than maximum output from any one individual operative. "In group work, individual starrng would even be detrimental but as a matter of fact it cannot occur, except momentarily, because an ambitious individualist would run himself out of parts to work upon." (1)

A third reason is psychological - the desire to introduce a collective incentive rather than an individual

(1) Lytle: "Wagg Incentive Methods" p. 62.

incentive in order to engender a better team-spirit and give to all the workers within the organisation the sense of working together towards the attainment of a common goal. This attitude towards payment-by-results is largely a modern development, associated with the rise of industrial psychology, although even before the advent of the present century Schloss wrote: "A detailed scrutiny of the various forms of collective remuneration discloses the presence in different kinds of group-work of a characteristic element of weighty importance. This is the mutual supervision exercised by the members of a group, each acting, in effect, as a superintendent in relation to the work of his neighbour, because all have a direct interest in the performance by every man of a full share in the common task."⁽¹⁾ This view is borne out by the experience of a large electrical firm in the North of England, employing several thousand female operatives engaged mainly on repetitive precision and assembly work. These girls were formerly paid on an individual piece-work basis, but it was found that as several girls worked in close proximity to each other on the same bench, the differences in their earnings led to constant bickering, jealousy and discontent. It was decided to experiment with a group bonus scheme, not because the output of the individual operatives could not be measured, but in order if possible to infuse a spirit of unity into the

(1) Schloss: "Methods of Industrial Remuneration".

working group. All the girls on a bench were regarded as a unit, and the output of that group was made the basis of piece-work payment. The total output of the group determined the total piece-work bonus payable, and this was divided among the individual workers. It has been found that this has led to a much better team spirit, and the members of the group tend to supervise themselves. Any girls who are inclined to slack are encouraged by the others to increase their efforts in the common interest of the group.

Classification
of Group

Incentives

These various reasons for the development of group incentives may be used as the basis of their classification. A broad distinction may be drawn between (i) group piece-work and (ii) production bonuses, the former arising from the impracticability of determining what is the output of any individual member of the group; and the latter from the desire to introduce a spirit of unity and collective purpose into the shop, department or works.

(i) Group
Piece-work

In many jobs, not only in mass-production, but also in batch- and job-production plants, a team of operatives work together to produce a certain output, but this output cannot be assessed on an individual basis. For example, in the Scottish ship-building industry, rivetting is almost universally paid on a piece-work basis. There is usually a standard price list per 100 rivets, and the payment is made on a group or "squad" basis. In hand rivetting the squad consists of two riveters, a holder-up and a rivet

heater; in machine rivetting the squad includes one riveter with his holder-up and rivet heater. The total piece-work earnings of the squad are computed on the basis of the price-list, and this amount is paid to the squad leader who makes the distribution among the members of his gang. In addition to the standard piece-work earnings, 34/- per week per man is paid into the squad pool by the employer.

Example of
Squad P.W.

Consider the case of a machine rivetting gang whose basic time rates are: rivetter 104/-; holder-up 85/-; and rivet-heater 85/-. Suppose the piece-work value (according to the price-list) of the work which they complete during their standard week of 44 hours amounts to 240/-, then their percentage piece-work balance will be:-

$$\frac{(342 - 274)}{274} \times 100 = 25 \text{ per cent}$$

(Note: (a) 342/- = 240/- plus 3 @ 34/-: (b) 274/- = sum of three men's basic time-rates.)

Their total weekly earnings will, therefore, amount to:-

Rivetter: 104/- plus 25% = £6. 9. 10d.

Holder-up: 85/- plus 25% = £5. 6. 1d.

Rivet-heater: 85/- plus 25% = £5. 6. 1d.

If, however, the rivet-heater was absent owing to sickness and only worked 36 hours during the week, his time-wage would be:- $\frac{36 \times 85}{44} = 69/6$.

Then the total time wages of the gang will be: 104/- plus

85/- plus 69/6d. = 258/6d., so that if the total piece-work value of their work remains at 342/- their percentage bonus will be:-

$$\frac{342 - 258/6d.}{258/6d.} \times 100 = 32 \text{ per cent.}$$

Then their total earnings will be:-

Rivetter: 104/- plus 32% = 137/7d. £6.17. 7d.

Holder-up: 85/- plus 32% = 112/5d. 5.12. 5d.

Rivet-heater: 69/6 plus 32% = 92/- 4.12. 0d.

Contract Piece-work.

A somewhat similar arrangement to the above is that known as "contract piece-work", ⁽¹⁾ and this, too, is found extensively in the shipbuilding industry. Platers have traditionally been paid on a piece-work basis, and as they work in large squads of sixteen to eighteen platers and holders-up their earnings are assessed as a group. A contract price is agreed between the squad and the employer for all the plating work on a ship or part of a ship, the calculation being made according to the price-list of the particular shipyard. This contract price is paid to the men irrespective of the time which they take to complete the job, and the distribution among the individual members of the squad is made by the squad-leader.

The electrical trade is normally a time-rate trade, but during the recent War the Electrical Trades Union relaxed its prohibition against piece-work so far as ship-building and ship-repairing was concerned and so long as the piece-work bonus was calculated on a group contract basis and not an individual one.

(1) For sample contract document, vide Appendix "E"(1).

The following case, from the experience of a Scottish electrical contractor, is cited as an example of how the contract method of piece-work works out in practice. Before the Electrical Trades Union agreed to payment-by-results the contractor found that his labour costs were very high owing to the necessity of employing inexperienced hands and men who had been compulsorily directed to shipyard work. There was a general atmosphere of disgruntlement and dissatisfaction, and a good deal of slacking, and as soon as possible the contractor, convinced that payment-by-results was the only solution, introduced a contract system of piece-work. The squad consisted of about 160 individuals, including journey-men, apprentices, male and female trainees, and a few unskilled labourers. The work was the electrical installations on Tank Landing Craft, each contract comprising about fifty vessels, giving a run of repetitive work lasting for at least six months. The work on each vessel lasted about one month and employed a squad of twelve to sixteen workers.

A price was fixed for each vessel, covering all types of work involved in the contract, and this price was paid to the squad irrespective of how long they took on the job. It was, therefore, in their own interest to get the job done as quickly as possible, and it was found that labour costs fell by as much as 45 per cent, which meant that the men earned 82 per cent. bonus on their time wages. During the period of the contract - usually four weeks - the standard weekly

wages were paid, and at the end of the period the difference between the wages paid and the contract price was distributed to the men in proportion to their time-wages.

Problems of
Contract
Piece-work.

The system of contract piecework is not without its difficulties. Apart from the inevitable problems of rate-fixing, the squad method has its own peculiar limitations. In the above-mentioned contractor's own words: "In each squad there were always the black sheep who would not work, all out for the bonus, and who depended upon the others to work. There were the slow workers and the bad workers who work had to be done all over again, and I found that the only way was to separate the good men from the bad, which meant that some squads, composed entirely of good men, earned very high wages, and that others barely earned anything extra. In the main, however, it was the trouble-makers who spoiled the squad - men who had been directed away from home, or habitual trouble makers. The only cure, therefore, was to get rid of them, and this was not always easy under the Essential Works Order." This illustrates one of the major problems of group incentives; many employers contend that they have the tendency to reduce the good man to the average level. The man who is skilled and conscientious, seeing his workmate failing to contribute as much as he might to the joint output, tends to the view that his extra effort is not worth while, and he slows down accordingly. Others employers take the opposite view, also held by Schloss,⁽¹⁾ that since the

(1) Vide supra.

interests of the individual members of a group piece-work scheme are inter-related, each will see that the other does his proper share of the work.

It seems that, where group piece-work is in operation, the groups should be kept as small as possible consistent with the type of work, and, if possible, the individuals comprising each group should be always kept together. This gives the fullest opportunity for the development of group discipline and minimises the difficulties outlined above. Whenever a change has to be made in the constitution of the group - a transfer made, or the group added to or subtracted from - the men should be consulted and their approval obtained. In this way charges of damaging workers' bonus by taking away good workers or bringing in poor ones, may be avoided, and the confidence of the men secured.

Where contract piece-work operates, the length of time of the contract should be as short as possible. The above-mentioned contractor found that his period of a month was rather too long. Most men are primarily concerned with their week's wages, and they would rather have a bonus payment each week than a correspondingly larger lump sum at the end of the month. If the period of the contract is too long, the men tend to lose interest, and the power of the financial incentive declines.

These difficulties associated with the working of the

contract system of piece-work were commented upon by a trade union official reporting upon his experience of payment-by-results in the war-time shipbuilding industry. He said: "The introduction of the system of payment-of-results, based on the contract method, was designed to eliminate individual competition and to prevent setting man against man. In practice it very often works in the reverse. The teaming of men calls for individual respect, and under conditions where the men are known to each other this condition can be fulfilled and men will work together in a spirit of co-operation.....The system also demands the placing of a certain amount of confidence in the employer, and on the employer's part a willingness to give a square deal and an honest price for the job. Without confidence there is a tendency to withhold effort and if a square deal is not forthcoming effort will not be maintained. For successful results, there must be a restriction of squads to the minimum to do the jobs efficiently, and the jobs to be carried out should be broken down as far as possible." (1)

Where this mutual confidence does exist, contract piece-work can be highly successful. Of one large Merseyside firm it was reported: "payment-by-results has operated very successfully since its inception. This

(1) Report by the Electrical Trades Union on Payment-by-Results in the Shipbuilding Industry, 1945; section containing reports of Area Officials on the Contract Method of Piece-work.

is largely due to the high level of co-operation, existing between the management of the firm and the workers' representatives. There has not, as yet, been a dispute regarding price or the application of payment-by-results between the management and the union. It has been agreed both by the management and the union that ships have been completed quicker and with less electrical labour than would have been the case if payment-by-results had not been operated." (1)

Contract
Piece-work in
the Oil
Industry.

The contract method of piece-work has also been markedly successful, and is widely used, in the maintenance of refining plant in the Scottish oil industry. Although the actual oil refining processes are paid on a daywork basis, the work of dismantling, cleaning and repairing the plant is carefully time-studied and executed by squads of men on a contract piece-work basis. These men normally have other duties to perform, but they group together for the cleaning and over-hauling operations. Frequently the squads are self-selected, and the price per operation is settled by discussion between the management and the squad leaders, usually yielding time and a half or more to the employees. The contract system is, on the whole, considered to be satisfactory, and is the recognised method throughout the industry. One mine manager reported: "We find today that progress by this method outstrips that made by time-rate payment to our men, or by the employment of outside

(1) Ibid. Report of Merseyside Area Official.

contractors".

Summary.

To sum up the position with regard to group piece-work; it is no different in principle from individual piece-work - its purposes are the same, and the only difference is that the output of a group rather than an individual is the determining factor, owing to the impracticability in certain cases of determining what the output of the individual really is. The incentive power is, however, less than that of individual piece-work, because the relation between effort expended and earnings received is less direct; it does not necessarily follow that a man's wage increases in proportion to the extra contribution he makes to the group output - much depends on what his colleagues are doing. Thus, if there is going to be real co-operative effort there must be a real team-spirit within the squad, and this necessitates a small group, homogeneous as far as possible, and, to a degree, self-selected. If the incentive power is to be kept at a maximum the interest of the man must not flag, so that the period of the contract should be as short as possible. Most important of all, as with all methods of payment-by-results, mutual confidence between management and men is an essential to success, and no effort should be spared to secure it.

(ii) Production Bonuses.

The second broad type of group incentive is that which is usually known as a "production bonus"; its *raison d'être* is not so much the impracticability of

assessing individual output, as the desire to introduce a spirit of unity and collective purpose into the shop, department, or works.

"Priestman"
Plan.

A simple scheme inaugurated by Messrs. Priestman Brothers of Hull in 1917 has come to be regarded almost as the classic example of production bonuses. The plans of the management were thoroughly discussed with the foremen elected and representatives of the workers before any steps were taken, and in order further to gain the confidence of the men, the company promised them a 10 per cent bonus whether output rose or not, if a fair trial was given to the plan. In consultation with the Works Committee, the management fixed a standard output, and a bonus was payable on all employees' wages, proportionate to any increase which might be achieved over this datum line. If output exceeded the standard by five per cent, then every employee received an additional five per cent bonus on his basic time-wage, plus the 10 per cent promised concession. The standard was reviewed, and the bonus paid, each four weeks. The Works Committee and the management agreed upon any adjustments which might be necessary in the standard, due to substantial increases or decreases in the labour force, or similar factors. The scheme worked well and had the full co-operation of the men and their unions, and it illustrates how a simple group plan of this type can sometimes be successful where individual piece-work would be impracticable, or where it is

particularly desired that a spirit of co-operation between all sections of the staff should be fostered.

Calculation of Bonus.

In the Priestman Plan, wages are enhanced by the same percentage by which the target output is exceeded, but this is by no means universal, although its simplicity is an advantage. In arranging the bonus system, two factors must be borne in mind. In the first place, the bonus must be sufficient to give a financial incentive which will increase output; extra effort or skill must be adequately and proportionately rewarded. On the other hand, the bonus must not be so liberal that it puts up unit cost of production. Thus, the first step in establishing a production bonus is to fix on the composition of the group - works, department, shop or squad - and measure its output in a normal period. Comparing this figure with the current wage rates will enable labour cost per unit of output to be ascertained. Then the bonus must be worked out so that successive increases in output will not result in uneconomic increases in unit cost of production, and this may require a somewhat more complicated arrangement than that embodied in the Priestman Plan. For example, a small firm in the engineering industry had a production bonus scheme⁽¹⁾ operating during the War when it was engaged upon repetitive manufacture for the Ministry of Supply. A basis figure of monthly output

(1) Vide Appendix "E" (2)

was agreed upon, and any increase over this datum line was regarded as the amount upon which bonus was payable. The actual amount of cash paid out in bonus was five per cent of this amount, and this was paid out to the workers in proportion to their monthly gross earnings. The percentage payable was worked out on the following formula:-

$$\frac{\text{Total monthly bonus}}{\text{Total monthly wages}} \times 100 = \text{Percentage of each worker's monthly gross earnings to be paid as bonus.}$$

Increasing Rate
of Bonus.

In the two cases cited, no bonus is paid until the standard output has been reached, and then only on the output in excess of this standard. Alternatively once the standard output has been reached, a bonus may be paid over the whole output; or again, no bonus may be paid until the standard is reached, and then a bonus paid on the standard output, and a higher bonus on output in excess of standard. Some firms have reduced the bonus after a certain point has been reached, but this detracts from the incentive power of the bonus system. Each increment to output calls for a greater amount of effort than the last, so that the bonus should increase rather than decrease as output goes up. With a greatly increased output, the consequent reduction in overhead costs should enable the management to pay this higher rate of bonus.

This method has been successfully adopted by a South Wales iron and steel company, engaged in the re-rolling of steel in a modern, continuous mill, one of the most efficient

in the country. Thus the cost of the plant was high compared with the labour cost, and maximum production from the plant was a necessity. A standard output per eight-hour shift was fixed for each different size of bars produced, and every employee's basic rate of wages is increased, by a percentage bonus, in proportion to the excess of actual output over the standard. In addition, a "super-bonus" is paid at the rate of one per cent for every eight points of the percentage bonus up to 40 per cent, and at the rate of one per cent for every five points thereafter. In this way a higher reward is given for the greater effort required as output improves, and as the bonus is paid on the output of the shift rather than the individual workers, the maximum encouragement is given to team-work. The following is an example of how the bonus is worked out in practice, in the case of a single shift on a job for which the standard output is 140 tons of steel:-

Actual output	140	210	280	350
Percentage increase	-	50	100	150
Job-rate (per shift)	10/-	10/-	10/-	10/-
Percentage bonus	-	5/-	10/-	15/-
Super-bonus	-	8d.	1/8	2/9
	10/-	15/8	21/8	27/9
Sliding-scale and cost-of-living bonus	8/9	8/9	8/9	8/9
Total pay (per shift)	18/9	24/5	30/5	36/6

In addition to these bonuses, each half-year all those in

the scheme receive a cash bonus on their earnings for the past six months at the same rate as the dividend paid on the equity capital. In this way the interest of the individual workman is extended to the efficiency of the whole organisation, and not merely his own particular work. The bonus has, in recent years, averaged 110 per cent., indicating an output of approximately 100 per cent above the standard. But since this standard is fixed at such a low level that it is quite normal and easy to achieve a 50 per cent increase, it cannot be used to represent "normal output". Assuming normal output to be 50 per cent above standard, the average of the past few years has been one-third above normal. At this point, it is calculated that costs fall by nine per cent., wages rise by 25 per cent., and profits rise by 10 per cent per ton, and 47 per cent per week of ten shifts. In addition to these indications of success, the average length of service with the firm is ten years, and but for the influence of the War, would probably have been as high as fifteen years. The scheme has clearly achieved its purpose.

Bonus or
Time off.

An indefinite number of variations on the general theme of production bonuses is possible. One of the largest firms in the sheet metal trade, which normally pays only on a day-work basis, instituted a production bonus during the War to counteract the general falling-off in productive effort experienced largely because of the employment of directed labour and untrained new entrants. Teams of individuals were given a production target each week, based on pre-war

performances, and once this target was achieved benefits accrued to the workers. The men received the usual type of cash bonus, but the women were allowed to finish work the moment they completed their output quota for the week. This original variant was found to be very effective; the women seemed to value time off more than extra money - many were married women with domestic duties, and extra money was subject to heavy taxation - and they much appreciated getting a full week's wages and yet having eight or ten working hours in hand at the end of the week, which they could use for any purpose they desired. The men, on the other hand, seemed to be more interested in money than time off, no doubt mainly because they had family responsibilities, all the more difficult to meet because of heavy taxation and high prices.

A "Points"
System.

A system based on the "points" method of assessment is in operation in the factory of a well-known firm in the Greater London area, manufacturing toilet preparations. The plan was introduced with the deliberate intent of promoting a sense of responsibility among the employees both to the management and to each other, and with a view to matching greater effort with greater reward. As the explanatory leaflet⁽¹⁾ says: "The Pool is a co-operative incentive and confers on those sharing in it a definite responsibility to act in every possible way in the general interest. The conduct of every single person participating in the Pool affects the amount to be shared by all. Every member of the Company should understand this vital point, and accept the

(1) Vide Appendix "E"(3)

duty and responsibility implied."

Each product is given, by the management, a "points" value based on its selling price. There are two "pools", a sales pool for the administrative and distributive staffs, and a production pool for the manufacturing staffs. The size of the sales pool is determined by the points represented by the total net sales for the month, and at the end of each month the value of these sales points is distributed among the employees in proportion to each individual's salary. The production pool is made up of the points represented by the articles which reach the Finished Stores and which are ready for sale. Payments from this pool are made weekly instead of monthly, and a visible indicator shews day by day the pool points as they accumulate, and the total reached and the percentage paid during the previous week. All members of the permanent staff are thus embraced in one or other of these pools, so that co-operation of the whole organisation is emphasised and encouraged. The scheme is flexible in that an employee is not penalised by being transferred from one job to another, and every employee is encouraged to point out any undesirable factors which may be damaging the interests of the whole organisation.

Measuring Output.

By employing the device of points a wide variety of products can be reduced to a lowest common denominator, as it were, and a proper basis of comparison and measurement established. This is one of the difficulties of administering a production bonus; a very common basis for measuring

output is weight, but this is satisfactory only where products are comparatively uniform, it is not a satisfactory method if during a certain period light articles are made which take just as much time and effort as the same number of heavy articles made during another period. The same disability applies to a numerical assessment of output. Consequently, the most common basis of measurement is value, but even this is not completely satisfactory, as many factors enter into the determination of selling price which are not within the control of the workers, e.g. supply and demand in the market, price fluctuations, trade boom or depression, foreign competition, and so on.

Seasonal Fluctuations.

This problem of measuring output was one of those which faced a West of England chemical fertiliser factory in which it was proposed to introduce a production bonus scheme. The demand for fertiliser is excessively seasonal; for months sales are low and manufacture is for stock; for the remainder of the year demand is heavy and stocks are withdrawn. In this particular case the firm was comparatively small, and only a few key men had fixed duties all the time, the remainder, either in small teams or as individuals, had frequently to change their role in the total production scene.

At first the firm introduced what was called a "responsibility" bonus, aimed at quality of work,

willingness to co-operate with different individuals and to suffer changes in occupation, team-spirit, and sense of responsibility. The bonus amounted to five shillings per week, and was awarded, at the discretion of the foreman, to men who could be relied upon (a) to work conscientiously without supervision (b) to change over willingly to some new task if required and (c) to maintain a good standard of timekeeping.

This was not so much an output bonus; it was concerned with quality rather than quantity, and the problem of finding a satisfactory measure of production was not easy of solution. Not only was demand highly seasonal, but furthermore the arrival of raw materials was very erratic. Some raw materials were hygroscopic, i.e. in wet weather the humidity of the atmosphere slowed up some mechanical processes such as screening, so that speed of production varied with the weather. Against this difficult background, any bonus scheme would have to allow for constant changes in the constitution of the gangs of men who performed the multitudinous and constantly fluctuating duties involved in the manufacturing processes.

Under such circumstances, the datum line for output had to be fixed in relation to a period long enough for these fluctuations to cancel out, so the management budgeted for a full twelve months ahead, setting minimum monthly targets for all the firm's products. These

monthly targets varied according to the known variations in seasonal demand; for the slack month of June the target was only 200 tons, whereas 600 tons was the standard for the peak months of the spring. The arrangement was that if these monthly targets were reached, an output bonus was paid each week during the following month - for men receiving the "responsibility bonus" it was 10/- per week, for others 7/6d. Thus, the same bonus was paid for 200 tons in a slack month as for 600 in a busy month, but it was explained to the men that their ability to reach the despatch target in the busy months depended largely upon the building up of stocks in the months of low demand.

The scheme proved to be successful from the start, and in four years monthly targets were only missed twice, despite difficulties like shortages of raw materials, plant breakdowns through war-time wear, and so on. Perhaps the greatest gain of the scheme was the steady reduction in overtime which it brought about by stimulating output during normal working hours.

There was, however, a natural tendency for output to settle down at the monthly target figures, and in order to keep the incentive alive an "extra output bonus" was instituted. For the busier months, 600 tons was the monthly target, that is 150 tons per week. If this weekly target was exceeded, a sliding scale of bonus

payments came into operation, e.g.

151-160 tons	....	1s. 0d.	per day.
161-170 "	....	1s. 2d.	" "
171-180 "	....	1s. 4d.	" "

and so on.

A lower scale applied to men not qualified for "responsibility bonus"; this started at 8d. per day extra and went up in 1d. stages for each ten tons extra output.

This supplementary scheme, too, has proved quite successful in three years' working, and the average bonus is quite substantial. Over the five years during which the incentive schemes have been built up, output has increased by 125 per cent, and, despite wage increases and shorter hours, labour costs per ton have either fallen or kept steady year by year. The firm has found it easier to secure suitable employees owing to the existence of the incentives, and, furthermore, labour turnover has been substantially reduced.

Summary.

Experience gained in these and many other schemes enables a summing-up of the relative advantages and disadvantages of production bonuses to be made. First of all, as compared with daywork, group bonuses, like individual piece-work, give a definite financial incentive to increase output. Like individual piece-work again, however, there are disadvantages - there is the same

emphasis on quantity rather than quality, and the same friction over rate-fixing. Perhaps problems of rate-fixing are less severe with group than individual piece-work for, although standards do have to be set, these need not be so exacting, for the figures of output will be averaged over a number of men, and "loose" and "tight" rates will tend to cancel out. Some protagonists of collective systems go further, however, and contend that they obviate the necessity for cutting piece-rates, but the validity of this contention is doubtful. Under piece-work, rate-cutting usually arises for one of the following reasons: (a) avarice of employer. (b) change of method or material, (c) mistake in calculation, or (d) rate too high for competitive working. As for the first, if this attitude of mind exists it will work out its purposes whatever the system may be. As for the remaining three reasons, they all result in the same thing, namely a cost structure which is considered to be too high for competitive working. The position is fundamentally the same whether individual piece-work or production bonus is in operation - some way out of the impasse must be found, either by cutting rates, or in the case of production bonus by raising the basic-output or cutting the percentage bonus. The answer to the problem lies not in a choice between individual or collective systems, but in the accurate fixation of piece-rates or operation times. If rates are fixed accurately (e.g. by time and motion study) the third and fourth reasons for rate-cutting will not arise, and if

methods are changed so that operation times are reduced, a direct comparison can be made with the previous assessment, and rates can be adjusted without incurring a charge of arbitrary rate-cutting.

The great advantage claimed for collective systems is that they promote team-work; it has been said of individual piece-work; "If an individual gets on better and makes a better showing by setting another chap back a bit, that is in the game too - or at least it is in the nature of the incentive that he shall as readily do that as advance his own case in any other way. We cannot look under individual incentives for the development of any wide spirit of co-operation. It is definitely an instrument of developing an attitude of each for himself."⁽¹⁾ It has been clearly shewn in the examples quoted that production bonuses emphasise the "one-ness" of the whole organisation, and the paramount need for co-operation in achieving a common purpose. The bonus is paid not only to direct workers, but also to executives, supervisors, inspectors, tool-men, maintenance staffs and so on, in recognition of the fact that all have contributed to the increase in output. Whereas under individual piece-work for direct workers, there is the ever-present problem of how to compensate indirect workers for their extra effort which, however, cannot be measured,⁽²⁾ under collective systems this problem does

(1) H.S. Dennison: "Incentives for Executives".
(American Management Association)

(2) Vide Appendix "H".

does not arise. Again, individual incentives may make the slower workers feel resentful towards their more efficient fellow workers who earn higher wages and who may cause the employer to cut the rate. With a group incentive, however, all the members of the group have a common objective, and team-work is given a definite financial encouragement. Mention has already been made of the experience of the Merseyside firm which found that individual piece-work led to constant ill-feeling between the girl operatives working on the same bench, but earning widely different piece-work bonuses; when a group scheme was introduced this difficulty disappeared and output was substantially increased.

On the other hand, many employers contend that group incentives tend to reduce the good men to the average level. There is really no moral or economic reason why "A" who is a skilled, keen and conscientious worker should have to "carry a passenger" in the person of "B", who is a slacker, as is liable to happen under a collective system where every employee gets the same percentage bonus whether or not he works hard as compared with his fellows. The device of the "responsibility bonus" already mentioned may, however, help to meet this difficulty. A large Scottish firm of electrical and mechanical engineers uses group piece-work for certain types of work which lend themselves more readily to collective than individual systems. It has

been found, however, that the best worker is penalised by the smaller output of the less efficient worker, and whereas the better workers prefer individual piece-work, the less efficient prefer the collective method.

A further objection to collective systems is that their appeal is far less direct and powerful than that of individual piece-work. It is well-known that the main reason for the small polls in Government and municipal Elections is frequently that the individual feels that his small contribution cannot make much difference either way to the result of the election; he forgets that the whole is made up of the sum of the parts. Similarly, in a factory employing the collective system of payment-by-results; the individual worker is inclined to feel that his contribution cannot appreciably affect the output of the firm as a whole, and the incentive value is consequently much less than that of the individual system under which a worker's pay packet depends entirely upon his own individual efforts. The collective method seems to suffer in many ways from the same defect as the time-rate system, for a flat rate of bonus is paid to all, irrespective of individual differences in output.

Thus the choice depends largely upon the nature of the work; if the maximum incentive is required and individual output can be measured, individual piece-work is to be preferred. Where, however, jobs are interdependent and team-work needs to be encouraged, group incentives may

more fully meet the need. There is this to be said for group incentives; much of our modern industrial work is highly monotonous, owing to the ever-increasing use of machinery and the specialisation of labour down to the smallest details. It is possible that group incentives may act as an antidote to this monotony by providing a new interest for all the members of the group, giving them a "sense of purpose" and uniting them in the fulfilment thereof. Group incentives may be the answer to one of the most difficult problems of the machine-age, developing an "esprit de corps" in industry, satisfying the naturally gregarious nature of man, and giving to highly specialised, repetitive workers a sense of "belonging" to some purpose bigger than themselves. All these may restore to the worker some of the satisfactions of the old craftsmanship days, satisfactions of which he has been robbed by the Industrial Revolution.

CHAPTER XV.MERIT RATING.

Merit rating is an attempt to assess the real value of an employee to his firm and the resultant merit rates are payments made in excess of the recognised base rates as a reward for the personal merit of the particular workers to whom they apply. They are something more than the "ability" rates common in the engineering industry although the basic principle is the same. Frequently in this industry workers of particular ability or reliability are paid an extra rate of so many pence per hour, the recommendation usually coming from the foreman to the works manager.

The same practice is common in shipbuilding, where workers are scattered all over the ship and will frequently be working alone in places where the exercise of strict supervision is difficult if not impossible. In such circumstances reliability and a conscientious attitude to work are obviously of great importance, and workers who shew these traits are paid ability rates.

Such payments were adopted in other trades during the Second World War, but it was commonly held that once a worker had qualified for an ability rate, he had proved his skill, and the rate should not subsequently be withdrawn. This is alien to the true principles of merit rating, in which it is the current merit of the

individual which matters, and the rate may be varied either upwards or downwards, according to certain well-defined standards.

Robert Owen
(1771-1858)

It appears that Robert Owen, the social reformer and cotton mill owner of New Lanark, should be credited with being the first industrialist to develop a scheme of merit rating, on the basis of a set of "character books". In this book were recorded daily reports upon the employee and his work, and the results were displayed in visual form through the medium of "character blocks". These were wooden blocks, the six sides of which were coloured differently, each colour representing an evaluation of the employee ranging from bad to excellent. These blocks were displayed each day on the worker's bench so that he - and anyone else in the workshop - could see by the colour lying uppermost into which merit category he had been placed on the basis of the previous day's work.

Clothing
Manufacture.

This simple type of merit rating has been adapted to their own particular needs by a large English firm of overall manufacturers. Piece-work having been tried, this method was discarded owing to the very large number of operations which went into a made up garment like a boiler suit; rate-fixing for these required much detailed calculation and, even with mechanical calculators, it was found that a large wages staff was necessary. Point premium plans were also discarded in favour of a weekly base rate, plus a bonus on output, plus merit pay.

When a girl machinist attains a certain standard of merit she receives a badge, which carries an addition to her wage-pocket. There are various grades of badge, e.g. "Improving", "Efficient", "High Grade", "Excellent", "Super", and so on, each carrying a higher merit rate than the one preceding it. A girl may be demoted as well as promoted, and the scheme has been found to work well, having been extended to other workers in addition to the women machinists, viz. male cutters, stockroom staff, male packers and male machinists. Although there has been no perceptible increase in the quantity of output, there has undoubtedly been an improvement in quality, and a greater sense of satisfaction among both management and employees.

Although the origins of merit rating go back as far as the middle of the nineteenth century, there was little further development until after the First World War, and then it was mainly confined to the United States. In Civil Service, this country, the civil service has long used a form of merit rating for the purpose of selecting candidates for promotion. There is an "Annual Report Form" upon which an assessment is made of the candidate's (1) knowledge, (2) personality and force of character, (3) judgment, (4) power of taking responsibility, (5) initiative, (6) accuracy, (7) address and tact, (8) power of supervising staff, (9) zeal, and (10) official conduct.

The values attached to the various qualities are weighted according to the post for which promotion is being considered. Judgment is made as to whether the officer is (a) eminently suited for special and early promotion, (b) fitted for promotion but not for exceptional promotion, or (c) not fitted for promotion at present.

This, however, is merit rating merely for promotion purposes, and formal merit rating for the granting of special enhanced rates of pay is still in its early stages so far as this country is concerned. In the United States of America development has been much more rapid, and in some states merit rating is compulsory for government servants, and highly complicated rating scales and schedules are employed. A recent American survey⁽¹⁾ reported that 52 per cent of the companies covered were employing some kind of merit rating plan.

No comparable figures are available for this country, but so far as this present survey is concerned only 6 per cent of firms reported that they were using merit-rating, and this disparity is an indication of the tardiness of British employers to adopt this technique. Some employers argued that rating was not worth while, and could not be done satisfactorily, but some kind of rating is essential and is undertaken by every employer at some time or another. He rates "his employees, to all intents and purposes, every time he promotes one man

instead of another, gives one man a pay increase instead
 (1) Scott, Clothier, Mathewson and Spriegel: "Personnel Management" (U.S.A.) 1940.

of another, or in any way changes the relative status of various individuals. He expresses by those actions his over-all judgment of the relative standing of the various individuals who have received different treatment. The only question which needs to be answered is whether employers shall rate employees on a haphazard basis..... or whether they shall rate employees systematically, regularly, objectively, and as accurately as possible."(1)

Gaining
Co-operation.

It is inevitable, however, that if the merit rating plan is to take into account all the relevant factors which make up employee-value, some highly subjective and intangible factors will have to be assessed, despite the fact that there can be no precisely accurate methods of doing so. Although this is one of the difficulties, it is also one of the justifications for merit rating, for the chief advantage of the method is that it formalises the opinions of supervisors regarding their staffs, and provides some tangible basis for measuring those subjective but highly important qualities contributing to employee-value.

Because of this difficulty - if for no other reason - the full co-operation of all, management, supervision and workers alike, in the administration of the merit rating plan is of fundamental importance. It is obvious

- (1) H. C. Taylor: "Problems of Selecting and Evaluating Employees" in the "Engineering Bulletin", Extension Series 43, vol. 23, number 3 (U.S.A.) 1938.

that the rating scheme must be fair, both in design and in operation. Not only so, but it must also be recognised by the workers as being fair, and for this reason it must be simple to understand. There is a great danger that the framers of the scheme may be tempted to introduce refinements and complications to such an extent that the scheme becomes incomprehensible to the ordinary workman, and perhaps even to the supervisors who have to make the rating. It must be remembered that the shop supervisor cannot be expected to be au fait with the latest developments in rating techniques, and yet he must be able to make an assessment which will not cause dissatisfaction, or be open to criticism. There is always the danger that the rating may become arbitrary, and as far as possible assessments should be based on measurable factors; the unsatisfactory rating of intangibles leads to great difficulties and dangers, and may set up irritations which will result in loss of production or goodwill.

Trade Union
Attitude.

The general principle of trade union policy is that of "the rate for the job", that is that there should be no difference in rate of pay between different workers performing the same task. In point of fact this principle cannot be pursued to its logical conclusion; wherever systems of payment-by-results exist, differentiation occurs. In any case the principle is an unsatisfactory one, for there can be no doubt that the value of employees to their employer does vary; one man is more highly skilled, more

conscientious, a faster worker, than another, and consciously or unconsciously both employers and workers themselves are constantly making this kind of comparison. As we have already seen, this is a form of merit-rating in which every employer who makes promotions has to indulge, so that there is really nothing novel in the idea. A formal merit rating scheme, however, has the advantage that instead of the rating being done piece-meal and without any standards of judgment, it is done systematically upon agreed standards, and therefore is fairer to all concerned.

If this is demonstrated to the workers, and they know that they stand to gain financially by its introduction, merit rating schemes have a better chance of ready acceptance. It should be emphasised that no employee will receive less than the recognised rate for the job, whether this be a statutory rate or a negotiated one, and that everyone will have the chance of earning a higher wage based on the merit rating plan. It is of the utmost importance that the full confidence of the staff should be secured by giving them full details of the scheme before it is introduced, and allowing difficulties to be thoroughly thrashed out if and when they arise.

Example.

For example, in the case of a large firm of tyre manufacturers in the South of England, an explanatory leaflet is handed to all employees pointing out that the well-being of the workers and the company are really inter-

dependent. The leaflet goes on to explain how, under the merit rating plan known as the "Co-operative Award Scheme," every employee will be individually rewarded according to his or her own personal efforts. Before the scheme was ever introduced it was fully discussed at meetings held between the management and representatives of the employees. These representatives were elected departmentally, in the proportion of one representative for every ten employees. At the meetings these employee representatives were asked to pass on the information to their "constituencies", and in this way every department and every working shift received a detailed explanation of the scheme. The workers were encouraged to criticise the plan and offer their suggestions, and the management expressed their willingness to answer any questions which might be raised by employees. Finally, each representative was asked to state whether or not his "constituents" were prepared to support the scheme, and it was found that there was a hundred per cent acceptance of the plan in its final form.

It is necessary to ensure the co-operation of not only the workers themselves, but also of the management and the supervisors, who will have the ultimate responsibility of doing the actual rating. There may be a certain amount of scepticism on the part of the supervisors regarding the practicability of rating,

and meetings must be held with representatives of the top management at which the working of the scheme can be outlined to those who will have to do the practical work. Finally, full co-operation from the supervision cannot be expected unless the scheme is simple enough for them to understand.

Working out
the Scheme
(i) Factors
to be rated.

The purpose of merit rating has already been defined as the rewarding of each employee according to his or her employee-value during the period under review. In order that this may be done, the component factors of employee-value must be decided upon, together with their relative importance for each different type of employment, so that due weight may be given to those most essential.

In the merit rating scheme in operation in a large box-making concern, the following factors are taken into consideration: (1) quantity of output, (2) quality of output, (3) versatility, that is, willingness and ability to switch over from one job to another, (4) diligence, that is, conscientiously starting the job at the appointed time and working up to the recognised finishing time without wasting time and (5) time-keeping.

Number

The number of qualities to be rated should be kept as small as possible, otherwise the scheme becomes unwieldy in its construction and costly in its administration. There can be no categorical definition of the number which should be incorporated; this will vary with the type of employment,

but the number of qualities considered will usually be greater in the case of a supervisor than in the case of an ordinary worker, and the rating of an executive will be more comprehensive than that of a supervisor. In attempting to keep down the number of factors to be rated, however, care must be taken not to amalgamate several distinct and important qualities. For example, in one existing scheme, one of the factors rated is entitled "Work", a term which includes at least two distinct and vitally important factors, namely quantity on the one hand and quality on the other. The opposite mistake is sometimes made, and overlapping qualities are enumerated. On one merit rating form, for example, appear these two factors (1) co-operativeness, and (2) attitude to work; the rater might well ask where the one ends and the other begins.

Selection.

Not only will the number of qualities rated vary from job to job, but also the selection of qualities for rating, and where the whole staff comes within the merit rating scheme, several schedules will be required. In the rating of supervisors, for example, consideration will have to be given to such factors as powers of leadership, initiative, organising ability, whereas for the ordinary workmen, skill, diligence, care of tools and materials, and so on, will be the relevant factors. The desirable qualities will be different again for executives, research workers, sales representatives and others whose work brings them into

close contact with the actual or potential customers of the firm. In every case, only those qualities which are relevant to, and important in, the particular job to be rated should be included in the scale.

(ii) Weighting the Factors. Although only relevant and important factors should be considered in each case, there will inevitably be differences in the relative importance of the various factors in different jobs. The usual procedure is to weight the factors according to their estimated significance for each type of work, be it executive, supervisory or manual. For example, a firm of electrical manufacturers has a merit rating scheme in which the various factors considered are weighted thus:-

Quality of work	25	per cent
Speed of work	20	"
Attendance and punctuality	20	"
Reliability	10	"
Initiative	10	"
Care of tools and materials	5	"
Social attitude	5	"
Safety	5	"
Total	100	per cent

Supervisors are rated on a different scale, in which 1000 points cover:-

Leadership qualities	250
Job knowledge	200
Versatility	100
Co-operation	100
Self-improvement	150

Willingness to accept responsibility.	100
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New ideas and suggestions	100
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Promotions and salary increases are based on the results of this rating scheme.

These two scales within the one firm illustrate how different types of job require different qualities, and how the relative importance of these qualities varies from one type of work to another. In this particular firm, the selection and weighting of the factors was jointly agreed upon by equal numbers of employee and management representatives, meeting in the Joint Works Council.

(iii) Graduating the Scales. Once the qualities to be rated have been chosen, some kind of scale must be provided upon which the rater can indicate the degree to which the employee possesses and displays each quality in his work. There is an endless variety of types of scale; in some the rater inserts against each factor a percentage figure representing his estimate of the degree of that factor possessed by the employee being rated. This does not give the rater very much guidance, and leaves room for wide differences of judgment as between one rater and another. Then again, the number of graduation (100 possible steps) is large and these very fine discriminations are really quite impossible for the rater to make

In the majority of schemes, therefore, the graduations are comparatively few, and are described in words rather than indicated by percentages, as in the case of the two

scales reproduced herewith, ⁽¹⁾ the one for shop operatives or routine clerks, the other for a shop supervisor:-

Example: (a) Shop Operative or Routine Clerk.

Quality	Excellent	Good	Average	Poor	Unsatisfactory
Quality of Work	125	100	75	50	25
Quantity of Work	100	80	60	40	20
Job Knowledge	100	80	60	40	20
Adaptability	75	60	45	30	15
Dependability	50	40	30	20	10
Attitude	50	40	30	20	10
Total	<u>500</u>	<u>400</u>	<u>300</u>	<u>200</u>	<u>100</u>

Example: (b) Shop Supervisor.

Quality	Excellent	Good	Average	Poor	Unsatisfactory
Accuracy	150	120	90	60	30
Job Knowledge	125	100	75	50	25
Speed	100	80	60	40	20
Reliability	50	40	30	20	10
Tact	50	40	30	20	10
Attitude	25	20	15	10	5
Total	<u>500</u>	<u>400</u>	<u>300</u>	<u>200</u>	<u>100</u>

Words such as "excellent", "good", "average", "poor" and "unsatisfactory", whilst they are universally understood, and give the rater much more guidance than mere percentages, may yet have quite different constructions put upon them by different raters. The same problem of language interpretation is present in connection with the titles given to the various qualities; two raters might have totally different conceptions of what is meant by "attitude to work", or "co-operativeness". For these reasons, some merit rating schedules have full descriptions appended to each grade of

(1) Vide also Appendix "F" (1)

quality,⁽¹⁾ and sometimes even descriptions of the quality itself. This is an admirable refinement in that it is more likely to result in consistent interpretations by the raters than if merely single words are employed. When the descriptions are being evolved there is afforded an excellent opportunity for formalising the interpretations among the raters by taking them into conference on this important issue. Descriptions which are jointly agreed upon by the people who are actually to do the rating are likely to be better understood by them, and they in turn are likely therefore to give more consistent interpretations of those descriptions.

(iv) Calculating the Bonus. The amount of bonus payable depends upon the total number of points awarded to the individual. It must be emphasised that this total "score" must not be regarded as a mathematical calculation of the employee's value to the firm; the score secured on each quality has been based merely on a rater's personal judgment, subject to all the fallibility of human nature, so that the total score cannot be any more accurate than the sum of these individual assessments. Consequently, the same caveat must be entered here as in the case of factor graduations - over-fine discriminations are impracticable, and the employees should be placed into a comparatively few groups in which all are regarded as roughly equal. These groups correspond to steps in the bonus scale, the lowest step equalling the minimum consolidated rate for the job.

(1) Vide Appendix "F"(2) and (3)

For example, in the case of the two rating scales given above (Examples (a) and (b)) the scores of an unsatisfactory, poor, average, good and excellent employee would be respectively 100, 200, 300, 400 and 500. The following is the bonus scale applicable in this case:-

<u>Points</u>	<u>Group</u>	<u>Bonus: % on base rate</u>
100 to 150	1	Nil
151 to 250	2	15 per cent
251 to 350	3	30 "
351 to 450	4	45 "
451 and over	5	60 "

It will be seen that an average worker, scoring 300 points, would receive a bonus of 30 per cent over his time wage, an increase comparable to that usually given to an average worker on the piece-rate system. The datum line at which bonus first becomes payable is at 151 points, and this may be criticised on the grounds that bonus should not be paid to a worker whose assessment is somewhere between "unsatisfactory" and "poor". On the other hand, the datum line should not be fixed at the half-mark level, otherwise only those workers who are above the average would earn bonus, and this would be neither fair nor acceptable. It is better to err on the side of generosity, and if men get low scores, move them to more suitable jobs. In this way there is a strong incentive to reach above the average level of proficiency.

(v) Summing-up. On the rating schedule are spaces for certain details⁽¹⁾ regarding the employee concerned - his name, number,

(1) Vide Appendix "F"(3) and (4)

occupation and department - and concerning the rater, his name, signature, how long he has known the employee, and the date of the rating. In addition, some schedules contain such questions⁽¹⁾ for the rater as: "Is this person suitable for promotion?"; "Is he improving, stationary, deteriorating?"; Is he suited to the type of work he is doing? If not, for what other type?" This method forces the rater to canalise the impressions he has gathered of the employee, and formulate these into conclusions which will be a valuable guide when promotion problems come up for solution, or when a man seems to be unsatisfactory in a certain type of work.

Administering
the Scheme.

Some of the problems involved in evolving a satisfactory merit rating scheme have been discussed above; there remain to be considered sundry problems of administration.

Frequency of
Rating.

First of all it must be decided how frequently the rating is to take place; as it is the current value of the employee which is to be considered, clearly the rating process must be a continuing one. Very frequent ratings, however, involve a considerable and unnecessary addition to administrative costs, so the majority of firms rate at either six-monthly or twelve-monthly intervals.

Some companies rate all their employees at one time in the year, whilst others bring each employee up for rating

(1) Vide Appendix "F"(4).

on the anniversary of his appointment on the staff, thus spreading the task of rating over the whole year. The latter method makes it easier for the raters and enables them to give more time to each man, than if they had to do hundreds of ratings at the one time; in such circumstances there is always a danger that under the pressure of monotony and boredom the raters will rush their work and produce unsatisfactory results. On the other hand, if all the employees are rated at the same time, there is a greater likelihood of all the ratings being made on the same standard, since comparisons between employees can more readily be made when all are being examined together. This tendency is strengthened by the fact that raters can rate one quality at a time for all the employees. As the instructions of one firm to its raters read: "When you have rated the first employee for this first quality, turn over to the report for the next employee and rate him for the same quality. Work through the reports, rating the first quality for all your employees; then rate them all for the second quality and so on until you have rated all your employees for all the listed qualities."⁽¹⁾ This method has two major advantages, namely (a) that proper comparisons can be made between employees regarding the same quality, and (b) that there is less likelihood of personal likes and dislikes affecting the overall rating of any one employee.

(1) Vide Appendix "F"(4)

Organisation
of Rating.

Before the scheme is launched the officers who are to do the rating must be made fully conversant with it; they must be familiar with the form, method of scoring, standards to be observed, and action to be taken following the assessment. Instructions may well be brought continually before the raters by their being printed on the back of the rating form, as in the example reproduced in Appendix "F"(3) and (4). Care should be taken to see that personal feelings of raters do not distort their findings, but that the set standards are in fact strictly adhered to. In this connection it is important that all the raters put the same interpretation upon these standards, and for this reason frequent conferences of those concerned in the administration of the scheme are eminently desirable. Practice ratings might be made at such conferences, and comparisons made between the findings of the different raters.

A much debated question is as to who shall do the actual rating. Obviously it must be someone who has known the employee and his work intimately over a sufficiently long period of time to be able to make a fair and accurate assessment of his abilities and worth, and this person is normally the employee's immediate supervisor. It is, then, usual for this officer to do the initial rating, but wherever possible it is desirable for a check rating to be done by some other individual also familiar with the employee in order that bias may be eliminated, standards regularised,

and results rendered more homogeneous.

One firm in the electrical trade, for example, has a scheme in which three independent ratings of each employee are carried out by the foreman, a senior executive, and a director respectively. The three raters then discuss their findings and decide upon an agreed figure for each quality and for the total assessment. In another firm in the motor trade, the rating of the worker's immediate supervisor is scrutinised by a panel consisting of the works manager, the departmental supervisor, the foreman or chargehand concerned, and the personnel officer, the final assessment being made by this body. A great advantage of the committee method is that the interplay of several minds considering the same problem tends to iron out differences and give more reliable results. Again, the rater is less likely to allow his own likes and dislikes to enter into his rating, for he will have to justify his assessment before a critical committee. Ultimately, however, the only person who can perform the major part of the rating is the employee's immediate supervisor, and his conclusions should carry most weight in the final assessment.

Employee- discussion.

In many cases, if the employee wishes, he is allowed to see his merit rating schedule and to have the opportunity of discussing it with some official such as the personnel manager. This has the merit of providing the opportunity for frank discussion on either side, and the employee is

enabled to see where he has come short of the desired standard if such should be the case. This practice is much less common in the United States than it is in this country, but it seems to be eminently desirable, for if the employee is denied the opportunity of knowing the details of his assessment he will naturally conclude that the management has something to hide; in such circumstances ill-feeling and suspicion are almost bound to arise. The only good reason for not allowing such investigation is that the management is not confident of the soundness of the scheme or the ability of its raters, and if this be true the remedy lies in the improvement of the scheme or its administration rather than in the maintenance of an "iron curtain" of secrecy. There is no doubt that in all departments of management and industrial relations the less secrecy and the more frankness there are, the better are relations likely to be.

Conclusions.

One of the major disadvantages of payment-by-results is its emphasis on quantity rather than quality, and it is the peculiar virtue of merit rating that it redresses this balance by taking into consideration not only quantity of output but all those other factors which go to increase "employee-value". A Scottish chocolate manufacturing firm, for example, employs a straight piece-work system for those repetitive, routine tasks in which quality control is simple, but has a system of merit rating for the skilled process workers who are engaged

in the actual composition of the confectionery where quality is more important than quantity. A tyre manufacturing company has adopted merit rating because it is the skill and conscientious work of the individual employee which is the vital factor in tyre production; although the materials can be tested and the processes scientifically controlled, yet it is the work of the tyre builder which makes or mars the final product. Again, it is not possible to test a tyre after manufacture; selected ones from each batch can be tested in the laboratory or on test cars, but it is not possible to test the actual tyre which goes to the customer. It is all-important that the finished product should be perfect because a slight fault in the tyre may result in a burst on the road causing a fatal accident. For these reasons merit rating has been introduced, not merely to step up production, but also to increase quality of workmanship and all-round efficiency.

Another payment-by-results difficulty which merit rating can overcome is that of remunerating indirect workers and others whose output cannot be easily measured. Merit rating has the advantage of flexibility, in that it can be adapted to any type of work, direct and indirect, manual and sedentary, supervisory and clerical, executive and administrative. The fact that everybody in the undertaking is embraced within the merit rating system is an important psychological factor in fostering the team spirit in industry. There is always a danger of friction where direct workers are paid on piece-work, indirect workers on time-rate, and executives perhaps

on a profit-sharing basis. If everyone within the organisation is paid according to merit and on agreed standards grievances of this nature are less likely to arise.

Perhaps it is the greatest virtue of merit rating that if it is properly conceived and administered it can do much to improve morale and willingness to work conscientiously, since each employee knows that his work is being regularly assessed on agreed standards, and remunerated accordingly. Under ordinary conditions it is fatally easy for a supervisor whose department is running reasonably smoothly to take the line of least resistance and let things stagnate. Consequently, young and energetic workers, anxious for recognition and promotion, find themselves frustrated, and their initiative is cramped and ultimately killed. Merit rating forces supervisors to assess their subordinates regularly and scientifically, leading to a more consistent treatment of staff, and the bringing to light of latent talent whose ardour might otherwise have soon been damped. Since the assessment is done according to well defined standards and precautions are taken against nepotism, merit rating reduces the advantage which the highly vocal, "pushing" type of individual often secures over his quieter, more docile, but perhaps more efficient workmate.

So long as the employee is allowed to know the details of his assessment, merit rating can be a valuable guide to workers as to where they have not come up to expectations

and, therefore, the directions in which improvement may be sought. It can be a useful pointer also to the management in bringing to light vocational misfits, enabling workers to be placed in those occupations to which they are best suited.

Like any other system, however, merit rating is not without its disadvantages and difficulties. The most obvious difficulty is to ensure that the rating is done accurately and without favouritism or personal bias. The assessment of subjective factors can never be scientifically accurate, and personal judgments can never be completely standardised. For these reasons the rating of the immediate supervisor should not be accepted without question; there must be more than one rating performed by people who know the employee and his work intimately, and a check-rating by some higher official. Training of supervisors in the technique of rating is also essential, so that they know what the standards are and how they should be applied.

For a scheme of merit rating to be successful, the staff must have full confidence in the arrangements, and the value of joint consultation can hardly be over emphasised. Mention has already been made of the desirability of having staff conferences before the scheme is launched, and there is no doubt that facilities should also be afforded to the workers who do not get a good rating to have their assessments explained to them, and if they are still aggrieved, to lodge an appeal with the appropriate higher official.

Otherwise they will labour under a sense of grievance, good relations will be destroyed, and production retarded.

Finally, it must be admitted that merit rating can never have the same strong financial incentive as a direct system of payment-by-results such as piece-work. The connection between output and remuneration is inevitably less direct, and this must lessen the incentive power. On the other hand, merit rating takes into account factors which go to make up employee-value and yet are ignored in the ordinary piece-work system. A worker may produce a very large output, and yet be a constant source of irritation to his supervisors and fellow workers, so that his value to the firm is much less than that which is indicated by the mere measurement of his physical output. Whereas under piece-work this difference would be ignored, merit rating would take it into account, and the man would therefore have a definite financial encouragement to improve his behaviour in the workshop.

Summary.

To sum up, therefore, it may be said that, although merit rating has not the incentive power of piece-work, it has the virtue of being applicable to processes in which measurement of output is difficult or impossible; it encourages the development of all the factors involved in employee-value and not merely quantity of output; it has the advantage of group incentives in that it encourages a spirit of co-operation within the plant; and it provides avenues for the development of the latent

abilities of personnel who might otherwise suffer from a sense of frustration and grievance.

PROFIT-SHARING AND CO-PARTNERSHIP.

One of the most unfortunate consequences of the economic changes which followed the Industrial Revolution was the tendency to regard workers merely as "hands", appendages to machines, and their labour as a "commodity" to be treated like any inanimate product on the market. There were many who fought against this tendency at various times, and among them were the "Christian Socialists" of the middle-nineteenth century, men like Ludlow and Vansittart Neal, the founders of the Society for Promoting Working Men's Associations. Although the co-operative productive societies established by these pioneers failed to achieve real success, out of them was born a movement known as profit-sharing and co-partnership which still survives at the present time. The method had its origins, therefore, in the co-operative movement, but in the succeeding century it was adopted also by private enterprise, and it is with this aspect that this chapter is primarily concerned; developments in the co-operative field have been broadly similar to those in the field of private enterprise. In its evolution, the method has also lost its political associations with the co-operative movement, and since the Second World War all three political parties⁽¹⁾ have given their support to profit-sharing and co-partnership in one form or another.

(1) Vide: "Co-partnership Today" (Conservative Party)
Resolution passed at Liberal Party Assembly on
22nd. April, 1948.
"Industrial Democracy" (Labour Party)

Definitions.

Profit-sharing and co-partnership are not synonymous, but the latter is a more advanced development from the former, and there are many varieties within each. Government reports⁽¹⁾ usually adopt the definition of profit-sharing which was agreed at an International Congress held in Paris in 1889, namely "cases in which an employer agrees with his employees that they shall receive in partial remuneration of their labour and, in addition to their wages, a share, fixed beforehand, in the profits realised by the undertaking." The words "fixed beforehand" must be emphasised; the mere giving of bonuses or gratuities at the discretion of management or shareholders without any agreed basis does not comprise a true profit-sharing scheme. Again, a scheme does not really merit the title "profit-sharing" unless it embraces a substantial proportion of the workers, and is not confined to management and executive staffs.

Official sanction has been given to the definition of labour co-partnership adopted by the Industrial Co-partnership Association; it reads:-

"Co-partnership claims for all the workers that they shall share to some extent in the profits, capital, and control of the business in which they are employed. This may be stated more fully -

(1) e.g. Board of Trade Reports of 1894 and 1912, and Ministry of Labour Report of 1920; also Annual Statements in the "Ministry of Labour Gazette" published each year up to 1938.

- (1) That the worker shall receive, in addition to the standard wages of the trade, some share in the final profits of the business or the economy of production.
- (2) That the worker shall accumulate his share of profit, or part thereof, in the capital of the business.
- (3) That the worker shall acquire some share in the control of the business in one or both of the two following ways:-

(a) By acquiring share capital, and thus gaining the ordinary rights and responsibilities of a shareholder;

(b) By the formation of a co-partnership committee of workers, having a voice in the internal management."

Development.

The development of the profit-sharing and co-partnership movement has been slow and has had a somewhat chequered history. Until 1929 the movement continued to expand, although not steadily; there were many ups and downs, and interest seems to have been greatest when trade was good but industrial relations bad. "At such times there seems to be a recurring tendency on the part of the employers to resort to the expedient of profit-sharing as a possible remedy for the unrest." (1)

After 1929 interest flagged, and the number of schemes in operation declined steadily right up to the outbreak of war.
(2)

Although new schemes were started during this period,

(1) Board of Trade Report, 1920.

(2) Vide Appendix "G"(1)

their numbers did not make up for those that were abandoned, and in 1938 (the latest year for which statistics are available) there were known to be 399 undertakings practising profit-sharing, the approximate number of workers entitled to participate in the schemes being 261,000. The number of schemes in that year was 404, larger than the number of firms because some companies operated more than one scheme. About 430,000 workpeople were employed in the businesses having profit-sharing schemes, representing a little over two per cent of the employed population. The difference between this figure and the number entitled to participate in the schemes (261,000) is largely accounted for by the fact that in many cases employees share in profits only if they deposit savings with the firm, or purchase shares in the undertaking. Then too, there are usually qualifications for participation, such as the attainment of a certain age or employment for a minimum number of years. (1)

Abandonments. The decline since 1929 in the number of schemes operating has been so severe that by 1938 there were only about three-quarters as many as there had been ten years previously. This decline is not due to any lack of new schemes but rather to the number of existing schemes which have been abandoned. Leaving consideration of co-operative societies aside, by 1938,

- (1) Source of statistics: "Ministry of Labour Gazette" August 1939.
 (2) In addition, 19 schemes had ceased to count as separate schemes owing to the amalgamation or transfer of undertakings which formerly had separate schemes. Thus the number of schemes still operating in private firms in 1938 was 261. (Vide next page.)

691 schemes were known to have been started, and of these 411 had been discontinued. (2)

This is a very high rate of abandonment, although of course the figure is cumulative. The principal reason for abandonment has been lack of profits and success in the business (26 per cent of total abandonments); other important reasons have been apathy of employees or dissatisfaction of employers with results (21 per cent); changes in or transfer of business (13 per cent); enterprise abandoned, death of employer, liquidation of business, etc. (12 per cent); substitution of increased wages, shorter hours, or other benefits (12 per cent); and dissatisfaction of employees (4 per cent).

Employees Participating.

The dark picture is to some extent relieved by the fact that the steady decrease evident in the figures of the number of schemes is not found in those relating to the number of employees participating. Although there was a sharp decline from 267,000 to 223,000 during the depression years, after 1933 there was a steady increase until by 1937 the 1929 position had almost been regained (265,000). This was, however, the peak of the climb, for in the next year the number fell to 261,000, and one can only guess what would have happened had not the War intervened.

Bonuses Paid.

A similar trend is evident in the figures of bonuses paid each year. The average percentage fell from 5.7 in (2) Vide previous page.

1930 to 5.2 in 1932, and then rose steadily to 6.1 in 1937. There was a drop in 1938 in this figure also - to 5.9 per cent, the average amount of bonus paid or credited in that year being £12.10.9d. per head.

Gas Industry.

The high-light of the co-partnership picture is in the gas industry. Although the number of firms operating profit-sharing schemes is only a very small proportion of the total firms in all industries, a considerable proportion of undertakings in the gas industry have been consistently successful in the co-partnership field. Whereas in all industries taken together some 60 per cent of the schemes started have been abandoned, of 81 schemes started by gas undertakings up to 1938, only 12 had been discontinued, whilst 24 had been in operation for more than twenty-five years. Half of the capital invested in gas undertakings is subject to profit-sharing.

The South Metropolitan Gas Company was the first gas undertaking to adopt ^{co-}partnership; this was in 1894, but a profit-sharing scheme had been in operation during the previous five years. The employees' bonus is derived from the "surplus profits" available after a dividend at the rate of £5 per cent. per annum has been paid on the ordinary stock. These surplus profits are shared thus: three quarters to consumers in the form of reduced prices, one-eighth to shareholders as additional dividend, and one-eighth to employees within the profit-sharing scheme.

The bonus is distributed on a pro rata salary or wages basis; half is credited to the employee's deposit account and there earns interest; the other half is invested in the company's stock on behalf of the employee. The money in the deposit account can only be withdrawn in special circumstances, but it may be used for the purchase of more stock. If there is no surplus stock available from employees who have left or died, the company buys it in the open market, but certain restrictions are placed upon the employees' right to dispose of their stock holdings. By the end of 1943 the bonuses paid to employees under this scheme had amounted to £1,815,287, and employees' stock holdings stood at £559,360.

In this way employees not only share in profits, but also in ownership and control. There is a Committee of Management, under the chairmanship of the Company's President, with 35 members nominated by the Board of Directors and 36 elected by the employees. There are service and stock-holding qualifications for nominators and nominees, and at its monthly meetings the committee acts in a consultative capacity on matters ranging from wages and welfare to general company policy. Three employees serve on the Board of Directors; candidates for this office must have 14 years service with the company and hold £180 worth of stock.

The success of this pioneer scheme, led the way for a considerable expansion of co-partnership in the gas

industry, and the method has worked more satisfactorily here than in any other sphere. There are, no doubt, good reasons for this success; gas undertakings are of the nature of public utilities, with a steady demand for their product, so that their stock is not liable to any great fluctuations in value, and the level of profits is fairly steady, circumstances which are particularly well-suited to profit-sharing.

Methods.

A study of profit-sharing and co-partnership schemes reveals at least one outstanding feature, namely their infinite variety, ranging from the very simple to the highly complex. This is inevitable having regard to the widely differing circumstances obtaining in different firms; the proportions of capital and labour employed vary considerably from one undertaking to another; so also does the extent to which labour can influence the firm's output and its cost of production. Add to this the great differences in size and type of undertaking, and it is hardly surprising that profit-sharing schemes vary so widely.

These differences in method can be summarised under four heads, viz. (a) How the amount of distributable profit is determined; (b) How this amount is divided between capital and labour; (c) The qualifications for participation in the scheme; and (d) How the profit is distributed among the participators.

- (a) Distributable Profit. The first point to be decided is how much profit is to be made available for distribution. In our

definition of profit-sharing we have the phrase "share fixed beforehand", so that the method of drawing up the final accounts and balance sheet must be in accordance with the profit-sharing agreement. The amount of distributable profit can be varied by changes in the amount put to reserve, so that, unless there are rules regarding reserves in the agreement, the directors have a considerable amount of discretionary power over the amount available for the profit-sharing scheme.

There is great variety in the rules regarding reserves; in one large confectionery manufacturing firm, the scheme provides for three types of reserve: a Dividends Equalisation Reserve, an Advertising Reserve, and a Special Reserve, and the rules regarding these are fairly rigid. For example with regard to the first, the scheme provides that "The amount to be set aside annually out of profits is £20,000, or 10 per cent of the profits remaining after providing for Capital's Wage for the year, whichever is the greater. This Reserve is not to exceed one year's Wage of Capital."

A contrasting case is that of a textile manufacturing firm in the South of England whose profit-sharing scheme provides for "reserves made in the interest of the business against specific, and as far as possible definite, liabilities." Here, the discretionary power of the directors is obviously much greater.

Whatever may be the basis of definition of

distributable profit, the general procedure is for the statement shewing the amount of profit available to be presented to the Profit-sharing Committee for their approval. In some cases the committee can, if it thinks fit, appoint an auditor to check the statement, and in the event of an insoluble difference of opinion the matter may be referred to arbitration. It is essential that the method of preparing the accounts and balance sheet should be standardised so that there can be no grounds for allegations of "tinkering" with the amount of profit available for distribution.

- (b) Division of Profit. One of the thorniest problems in devising a satisfactory profit-sharing scheme is the basis of division between capital and labour. The general principle followed is that capital and labour are entitled first of all to their normal remuneration, namely dividends and wages respectively, and that neither should suffer from the existence of the profit-sharing scheme. In practice this means that after the necessary reserves have been made, the appropriate dividend on preference shares is paid, and thereafter a dividend up to a specified maximum percentage on the ordinary shares, after which the balance, or a certain part of the balance, is divided in some agreed proportion between the ordinary shareholders and the profit-sharing employees.

Block Division. One method of division is known as the "block" method, whereby the total amount of distributable profit

is divided into two sections - frequently into halves - one for capital and the other for labour. There is no particular virtue in an equal division, except that it does serve to inspire confidence in the scheme on the part of the workers, and this is an important psychological advantage. The method of division depends largely upon the relative importance of labour and capital in the plant; for example if the plant is ^{very} highly mechanised, and comparatively few workers are employed, an equal division would not be economically justified, although this might be over-ruled by the psychological advantage of an equal division. In a well-known English motor manufacturing concern, the plant is very highly mechanised, and this is reflected in the profit-sharing scheme. After deducting six per cent on the nett capital employed in the business throughout the year, an amount equal to ten per cent of the profits is paid into the fund; thus there is a heavy bias in favour of capital, due to the highly capitalised nature of the undertaking.

Rate Division. An alternative method of division is that in which the surplus profits are not divided in fixed fractions between capital and labour, but the rate of bonus due to the profit-sharing group bears some fixed relation to the rate of dividend paid on certain types of shares, usually the ordinary shares. For example, in one of the oldest schemes still in operation - a scheme which has in its fifty-six years of life become almost a classic -

the basis of division is that after paying five per cent on capital, any further profit available for dividend is declared at a uniform rate per cent on capital and on the year's total wages and salaries. In another firm of confectionery manufacturers the rate of bonus for members of the profit-sharing group is the average of the rates paid on the preferred and the deferred shares.

Block-rate Division.

A third method is adopted by some businesses, whose schemes provide for a certain sum to be set aside as the profit-sharing bonus, for every rise of one per cent. in the dividend rate on ordinary shares. For example a North-East England firm of chocolate manufacturers has a scheme in which $7\frac{1}{2}$ per cent is first paid on capital, and then for each one percent paid thereafter a sum of £1,000 is put into the profit-sharing pool.

"Notional" Shares.

Sometimes firms issue to workers what might be called "notional" shares, of no intrinsic value, but with a face value on which dividend is paid. One of the smaller English publishing houses has a profit-sharing scheme of this type; three classes of certificate are issued to workers, all of them bearing the same rate of interest as that paid on the ordinary shares. The certificates are (a) profit-sharing certificates, (b) bonus certificates, and (c) investment certificates. The first are issued to all employees on a scale varying with wage-rates; thus a worker earning up to £2 per week receives 75 certificates, and a further 25 for every additional 20s. per

week in wages. Bonus certificates are issued at the rate of ten for each completed year's service. These certificates have no market value, but dividends are paid on them, and an employee can, if he so wish, re-invest this dividend, together with any other cash, in investment certificates which are repayable at par at any time, together with any interest due. This method of payment has the advantage of smoothing out fluctuations in the amount of bonus distributed; in some other methods where surplus profits above^a certain figure are paid out, the amount available tends to fluctuate widely from year to year.

- (c) Qualifications. There are almost invariably certain qualifications for participation in the profit-sharing scheme, the most common being concerned with age and length of service. For example, one of the principal groups in the cement industry has the following rule:
- "All employees of 21 years of age are eligible to participate in a profit-sharing bonus provided that
- (a) they will by that date have completed one year of service to the satisfaction of the management; and
 - (b) they do not (or are not qualifying to) participate in the Staff Bonus, Foremen's Bonus, or other bonus scheme."

Sometimes the profit-sharing scheme is limited to certain classes of workers only, e.g. managerial staff; this is to some extent an attempt to devise a "payment-by-results" method to those whose output cannot be

measured, but who are in a position to influence very considerably the profitability of the undertaking. It is, however, very difficult to decide who should and who should not participate in such a scheme, for "management" is a term capable of various interpretations.

In other cases, the scheme is only extended to those employees in receipt of wages or salaries over a certain pre-determined level. In other cases again, in order to participate the employee has to join the co-partnership group, or perhaps be elected to it by its existing members. The general trend, however - and it would seem to be an admirable tendency - is for profit-sharing schemes to be made as all-embracing as possible, so that all the workers in the undertaking from top to bottom are made to feel that they are partners in the enterprise.

"Share-issue"
Schemes.

In the case of what are known as "share-issue" schemes, the employee is offered shares in the company on terms more favourable than those open to the ordinary investor, and it is a condition of becoming a member of the profit-sharing group that a certain number of these shares be purchased. In effect, the employee then becomes an ordinary shareholder of the company, but his right to dispose of his holding is restricted in view of the fact that he received preferential terms when purchasing his stock; he usually is only able to sell his shares back to the company at the price which he paid for them. Sometimes, instead of buying the shares at a discount, the employee-shareholder

receives a higher rate of dividend than that allotted to the outside investor. This method has the merit of encouraging the thrifty members of the staff, but it means that their savings are invested in a commercial undertaking, liable to financial fluctuations, rather than in a savings bank, national savings, or gilt-edged securities. There is, therefore, a greater risk of the employee losing his savings if his firm should come upon evil days, just at the time when his employment also is least secure. However, the method has worked successfully in a number of cases,⁽¹⁾ and it is employed by one of the large chemical combines whose workers can purchase shares at one-eighth per cent less than market price; they also receive a gift varying from one in four to one in eight shares bought, depending on their wage or salary level.

"Deposit"
Schemes.

The "deposit" type of scheme is of similar nature. Instead of employees buying the firm's shares on preferential terms, they are invited to deposit money with the firm, and in return are guaranteed a minimum rate of interest together with a further dividend varying with profits.

(d) Method of
Payment.

After deciding how the surplus profits are to be divided between capital and labour, and who is to participate in the latter's share, the further question arises, "How is the bonus to be distributed among the participators in the profit-sharing scheme?" The most usual method is to give

(1) Vide Appendix "G"(2)

a cash payment, which may be allocated in a number of different ways. In the first place, the amount available for distribution may be allocated in direct proportion to the wages or salaries of the employees; this is the most popular method, and has been adopted by so many firms as to have become almost a standard. Secondly, the fund may be divided equally among the participants, as is done in a number of cases in the gas industry. Thirdly, mention has already been made of those schemes in which special certificates are issued, the share of profit, depending on the type and number of certificates held. Fourthly, a "points" system of allocation may be adopted, whereby posts are graded on a points scale, with weights for differing periods of service with the company. Whatever method is adopted, it is usual to take length of service into account when allocating the profit shares to employees. One of the oldest schemes still in existence gives a double bonus to all employees over 21 years of age who have been with the company for at least five years. In another scheme the bonus is calculated on the nett wage or salary for employees with less than 10 years service, on $1\frac{1}{4}$ times the wage for those with 10 to 20 years service, and on $1\frac{1}{2}$ times the wage for those with more than 20 years service.

Payment in
Shares.

Although the simplest method of payment is obviously in cash, this is by no means universal; (1) payment may be (1) Vide Appendix "G" (2).

made in the form of shares, or partly in cash and partly in shares; then again, in some cases payment is made into a provident, welfare or superannuation fund for the benefit of the employees. For the method of payment in the form of shares it is claimed that a cash bonus is almost invariably spent soon after it is received, whereas the acquisition of shares encourages thrift on the part of the employees. In the South Metropolitan Gas Company's scheme already mentioned there are two accounts in the employee's pass-book, viz. "cash" and "stock". At the end of the year, bonus is credited to these accounts in equal proportion, and when sufficient money has accumulated on the stock account for the purchase of £10 of stock or more, stock is allotted to the employee in accordance with the rules. Cash can be transferred from the "cash" to the "stock" account for the purpose of acquiring more stock, and workers are encouraged to increase their holdings in this way.

This method of paying bonus in the form of shares means that profit-sharing is extended to become co-partnership, for the employees secure a share in the ownership and in some cases the control of the business. Frequently the shares allotted to employees do not carry the voting rights of normal shares for they are offered on preferential terms and the directors may fear that in course of time worker co-partnership will develop into full worker control to the prejudice of the existing

shareholders. It is desirable, however, that the sense of co-partnership should be made real to the employees, and experiments in joint consultation, the appointment of employee-directors, the formation of co-partnership committees, and the giving of information to employees about the working of the business, are all to be commended.

A disadvantage of the method of paying bonus in the form of shares is that it has not the same interest to the employee that a cash payment has, for the worker only receives in cash a small proportion, say 5 per cent or one twentieth of the value of his profit-share. On the other hand, if the firm has heavy commitments to meet, payment in stock may be easier than incash, although it may involve increasing the capital issue if there are no employee-shares available from decreased or resigned workers. The frequently adopted method of paying bonus partly incash and partly in shares is an attempt to reconcile these two conflicting points of view.

The method of paying profit-shares into a provident or superannuation fund offers very little incentive to the workers and has little to commend it. The reward is very remote, and to the younger workers especially the prospect of a pension on retirement compares very unfavourably with a sum in hand at the end of the year. Although its incentive value is small, however, it may tend to decrease labour turnover, as some workers will prefer to stay with the firm until retirement rather than

forfeit their accumulated rights in the superannuation funds.

Trade Union
Attitude.

The traditional attitude of organised labour towards profit-sharing and co-partnership has been one of hostility or at least suspicion. This attitude is partly based on the view that profit-sharing is part of, and tends to perpetuate, the capitalist system to which the trade unionist is usually politically opposed. There has been a feeling also that employers have introduced profit-sharing schemes merely as "sugar on the pill" with a view to undermining trade union solidarity and keeping down wage-levels.

Outright hostility has, however, in the last two decades gradually given place to qualified acceptance, much the same trend has been observed with regard to payment-by-results. Few firms today would attempt to introduce profit-sharing as a means of paying less than the trade-union rate of wages; the plan would be doomed to failure from the very beginning. The trade unions now realise that they have an important function to fulfil in securing proper conditions for the working of a profit-sharing scheme. They will be concerned to ensure that the agreed method of dividing profits between capital and labour is sound and in practice honestly followed; that there is no manipulation of reserves to reduce the distributable surplus; that employees have the opportunity of appointing their own auditor to check the accounts, and so on. In this way the trade unions can continue to fulfil their justifiable function of protecting the worker

against exploitation by unscrupulous employers.

Criticisms of Profit-sharing.

It has been said that profit-sharing is economically unsound because the worker is not entitled to anything more than a fair wage. Classical economic theory has certainly regarded wages as the reward of labour, and profits as the reward of risk-bearing, the function of the entrepreneur⁽¹⁾ and the connection between the efficiency of the workers and the profit ~~ix~~ earned is not direct. Profits may be better in one year than in another even though worker-efficiency has remained constant, because of successful buying in the raw material market. Conversely profits may decline, not because the workers have failed to come up to standard, but because of a general trade recession. This argument is sound, but, if the view of the more/enlightened employers, that the workers are partners with them in industry, is accepted, it does not destroy the case for profit-sharing and co-partnership.

Allied to this objection is the claim that if workers share in profits, they should also share in losses. However, if profits fail, the workers do not receive any share, and are not therefore in any better position than the shareholders. Again, if the position is even worse and the firm has to embark upon a policy of retrenchment, workers will either have to work short-time or lose their jobs; they are, therefore, sharing in the loss. Indeed their loss may be

(1) Vide, e.g. Knight "Risk, Uncertainty and Profit" for an able exposition of the theory of profits.

even more fundamental than that of the shareholders, for the worker who loses his job normally loses his whole source of income, whereas the investor usually has his risks spread over a large number of undertakings. In any case, ordinarily, workers share only in surplus profits, that is those profits which remain after the necessary reserves have been made and the normal rate of interest has been paid to shareholders.

Incentive-Value.

There are those who criticise profit-sharing and co-partnership on the ground that it is ineffective as a direct incentive to increased output, but to argue thus is to misunderstand the real function of profit-sharing. Profit-sharing is not a method of payment-by-results - it has been argued in earlier chapters that if a payment-by-results scheme is to be successful a worker's earnings should have some direct relation to output, preferably his own output, but if not, then the output of the working group of which he is a member, and the smaller this group is, the better. Then again, the working of the scheme should be simple, so that the ordinary workman can calculate what his pay will be; the more elaborate American systems have been criticised because they fail in this respect. By these standards, profit-sharing is a most unsatisfactory method of payment-by-results; the worker's share of profit bears no direct relation to his output; usually he does not receive it until the end of the year, and it is highly improbable that he will be able

to calculate in advance what his bonus is likely to be. The average bonus paid under a profit-sharing scheme is comparatively small; in 1938 (a good year) it was only 5.9 per cent., or £12.10.9d. per head. This is less than five shillings per week, and such a small sum as this can hardly be expected to act as a strong financial incentive to increased effort. Not only is the bonus small, but it is also very remote from the individual worker's effort and output; even if the bonus is paid in advance by quarterly or even monthly payments, the good worker gets the same relative bonus as the bad worker - there is no direct connection between individual effort and individual reward.

True Function of Profit-sharing. It must be admitted, therefore, that profit-sharing does not offer a strong incentive to increased output, but in any case this is not its true function. "We have been mistaken in regarding it simply from the standpoint of financial inducement; it should be regarded rather from the psychological point of view. In other words, its results have depended not primarily on how much employees have actually received, but rather on their knowledge that whatever profits resulted from the joint efforts of all concerned would be divided amongst them on some basis previously agreed upon as equitable."⁽¹⁾ So wrote one who has had a very long experience of business management, profit-sharing, and industrial relations, and the argument is sound. The principal virtue of co-partnership lies, not

(1) Rowntree: "The Human Factor in Business" p.191.

not in the value of the bonus as a financial incentive, but rather in its power to promote happier relations between employer and employee. A properly designed profit-sharing scheme automatically ensures that the worker is informed of the financial position of the firm, and so enhances the sense of partnership. This divulging of information traditionally regarded by the business-man as sacrosanct necessitates something of a revolution in business practice, but the improvement in employee-relations should more than compensate for any sacrifice of privacy involved.

The very title "co-partnership" gives to the worker a new status; he is no longer merely a "hand" and his labour a "commodity"; he is a co-partner, sharing ownership and control with the leaders of the business. A properly worked-out profit-sharing scheme can be made an excellent opportunity for the whole working of the undertaking to be explained to the employees, so that they can see where they fit into the organisation, and can understand the purpose of the tasks - probably minute and repetitive - in which they themselves are engaged. If the co-partnership plan is worked honestly and sincerely it can help to break down barriers of suspicion and promote goodwill, and thus, indirectly, serve to increase the efficiency of the whole undertaking.

In this connection the conclusions of a recent

American survey (1) are interesting. Several hundred companies which practised profit-sharing were questioned with regard to the value of their schemes in improving employee-relations. It was found that whereas 23.4 per cent of firms with no profit-sharing plans reported strikes in their plants, only 9.9 per cent of those with profit-sharing plans in which all employees participated had similar stoppages. This improvement in relations may not have been entirely due to co-partnership; other conditions in the plants may have been particularly good, but the results clearly indicate that co-partnership does serve to promote industrial peace.

The same survey revealed that, to be successful, profit-sharing must embrace the whole personnel, and not be confined merely to management, a practice which has had some protagonists in this country as well as in America. It was found that those firms which had profit-sharing schemes of the latter type experienced even more strikes than those which had no profit-sharing schemes at all (30.6 per cent as compared with 27.3 per cent).

Conclusions.

The conclusion is, therefore, that profit-sharing is not a satisfactory method of payment-by-results, but that it can be an excellent supplement to the more direct financial incentives, its principal value being

(1) "Survey of Experiences in Profit-sharing" United States Senate Report No. 610. Washington. 1939.

its power to engender a team-spirit and a sense of loyalty to the working group. This is even more true when profit-sharing becomes co-partnership, for then the status of the worker is raised from that of a hand to that of a co-partner with the management and owners of the business. For this reason, those schemes in which the employee acquires shares in the company (especially if those shares carry voting rights) are to be preferred to those in which merely cash bonuses are paid, for then the employee has a tangible and permanent stake in the fortunes of the firm in which he works.

There are, however, certain conditions in which co-partnership is most likely to be successful. Many schemes have been abandoned because in some years (perhaps many years) there have been insufficient profits to allow of a distribution among the workers; this has been the principal reason for failure in British experience of profit-sharing. However, many schemes have succeeded in weathering trade depressions, and an occasional year without profits need not necessarily be fatal; indeed it may be a salutary reminder that the bonus is not a part of wages, and does not come automatically as of right. Nevertheless, profit-sharing is least likely to fail where business conditions are reasonably steady, and where violent fluctuations are rare, as in the case in the gas industry where co-partnership has been so markedly successful over a long period of years.

C H A P T E R XVII.SUMMARY OF CONCLUSIONS.

That this country needs - indeed must have - greater productivity per man-hour will hardly be disputed anywhere today, and it has been the purpose of this investigation to discover the part which methods of wage payment can play in the drive for increased output.

The conclusion arrived at in the earlier chapters was that although non-financial incentives such as good working conditions, and happy industrial relations were of fundamental importance, yet the financial incentive, with all its limitations, was still the most powerful and direct stimulus to increased output available to the employer today. Mention has already been made of a number of factors which tend to blunt the edge of the financial incentive - high direct taxation, the development of more and more State services, the shortage of consumer goods, and so on - and it was suggested that it might be advisable to make certain changes in national economic policy in order to give the "carrot" a little more "flavour".

If this conclusion be valid, then it follows that some sort of payment-by-results is to be preferred to simple day-work. That is not to say that payment-by-results is a universal panacea for all industrial ills; it is no substitute for efficient management, proper production control, improved machinery and other primary fundamentals.

Indeed, if payment-by-results is used in an attempt to correct a low-output situation caused by lack of one or more of these fundamentals, it will merely serve to perpetuate a high-cost structure.

Essentials:

(i) Fairness.

Examination of the major systems of payment-by-results in the foregoing chapters has revealed certain essentials of a good financial incentive plan. The first and most obvious of these is that the system must be fair to all concerned, and contribute to the benefit of both employer and employee. This is of vital importance to an employer contemplating the introduction of any new incentive scheme, especially one which savours in any way of American methods, for the average British worker has a natural antipathy towards anything which he does not understand, especially if it comes from the other side of the Atlantic, the supposed home of the heartily despised and detested "efficiency experts". This is an important factor in favour of the straight piece-work system for almost every other type of incentive is of American origin, and has to be very carefully adapted before it can be applied to British conditions. The average British worker "resents arbitrary action; he denounces any system which he imagines will call for 'speeding-up'; he will fight against bullying or driving from overlookers; he cordially detests outsiders brought in as experts, and upon them lavishes his scorn and irony; above all, he fears, and therefore resists, what is new. By reason of his moderation and conservatism, he tends to

take long views and to demand guarantees against arbitrary action. On the other hand, he can be won to accept that which appeals to his sense of fairness; he goes some distance to meet the person who acknowledges his intelligence and his experience by consulting him on matters which affect his interests." (1) Full co-operation between management and men is, therefore, essential, and unless the scheme has the confidence of the labour force it is bound to fail. The channels of joint consultation should be fully employed both before the introduction of the scheme and during its working, and there should be a properly constituted agreement regarding its administration.

- (ii) No rate-cutting. If there is one thing more likely than any other to undermine the confidence of the labour force, it is rate-cutting. Where methods are changed so that the time required to perform an operation is substantially reduced, some adjustment in the rate will clearly be both necessary and justified, but arbitrary rate-cutting is to be heartily condemned. This means that rate-fixing methods must be sound enough to enable the management to give a guarantee against rate-cutting. In order to achieve this accuracy in rate-fixing, it will be desirable in many cases to employ time-study, and here again care must be taken to avoid hostility to this American technique. Details of the possible precautions have been discussed in an earlier chapter; suffice it to say here that a representative of the workers should, if possible, be
- (1) Dr. C.H. Northcott, writing in "unity" May, 1932.

allowed to be present at the time study and to have access to all the relevant information, in order that he may check its accuracy. The technique of effort-rating is a frequent source of grievance, and it is considered that the same end, namely to obtain a representative timing, could be attained more satisfactorily by studying a number of average workers.

(iii) Generous In order to provide a strong incentive the system should be high in task and also in reward; that is to say, the piece-rate or bonus time should not be "loose" but accurate, and the employee should receive a generous reward for attaining the required standard. There should be fair, guaranteed hourly rates, and the incentive scheme superimposed upon them should enable the average worker to earn an agreed percentage over these base-rates. If the reward for extra out-put, effort, or merit is niggardly, it will have comparatively little incentive power and will not achieve its purpose. For this reason, the premium bonus and other sharing plans, in which the piece-rate declines with increasing output, are not really satisfactory. Even if the bonus times are liberal, so that the average worker earns the same percentages over time-rate as he would on piece-work, he is still apt to feel that he is being cheated of part of the time saved, and the psychological disadvantage remains.

(iv) Simple. It is essential that the wage system be reasonably simple, so that the ordinary worker can understand it

and estimate the amount of bonus he is earning. This is a serious defect of the highly complicated American plans, for anything which a worker does not understand he naturally tends to mistrust, and mistrust and suspicion are fatal to efficiency and good relations.

(v) Balanced. It is important, too, that the wage incentive system should not upset the natural balance of wage rates within the plant. For example, if direct workers are put on payment-by-results their wages may rise so that the differential between their rate and that of their supervisors is considerably reduced. The balance has been upset, and supervision will become dissatisfied. It is not recommended that supervisors should be paid bonuses dependent upon the output of the departments which they control; this tends to make supervisors into drivers rather than leaders, a tendency which seriously mitigates against good employee relations. In order to maintain the balance of wages, where the installation of a bonus scheme for direct workers involves the indirect workers (such as maintenance staff, labourers, etc.) in extra effort, they too should share in some way in the scheme.

(vi) Complaints Finally, there should be adequate channels through which the workers can make enquiries regarding their wages, and, if necessary, lodge complaints or appeals. Unredressed grievances and mis-understandings are so damaging to efficiency, output, and morale that proper arrangements for dealing with them should be made.

Production
Conditions.

When considering the relative merits of the different incentive systems, it is essential that the conditions of production should be borne in mind. It is quite impossible to say that this method or that is the best; it depends entirely upon the conditions and circumstances of production. First of all one must consider the quantity of the product to be made; is it sufficiently large to give a good run of repetitive jobs so that the expense of rate-fixing and putting the job on bonus will be justified? Then there is the further question of the type of product or operation; what is the degree of uniformity; can the job be standardised or it is essentially individualistic? Quality control is an important consideration; is the inspection of large quantities of the product by some independent agency comparatively simple, or is quality so all-important that increased speed of working is undesirable? In some trades the speed of working is outside the control of the operative, as in "process work" such as heat treatment, plating, etc. What is the unit of production, an individual or a group; and is it possible to measure the output of an individual worker, or only that of the squad to which he belongs?

These are some of the more important conditions of production, of which at least five broad types may be distinguished, viz. (a) mass production, (b) batch production, (c) job production, (d) process work and (e) indirect labour. Mass production exists where a very large number of units of

output is produced, under standardised conditions, and covering a narrow range of very similar products. Where the work is done in batches large enough to form a considerable proportion of the shop capacity, this is known as batch production. Job production consists of the manufacture of numerous very small batches or individual orders which do not recur frequently. The term process work is used to cover those operations in which the worker has little or no control over his speed of working, this being determined by circumstances outside the range of his responsibilities. Indirect labour covers the work of maintenance staffs, transport workers, cleaners, labourers, and similar work which is ancillary to the directly productive trades.

(a) Mass-Production.

No one system of wage payment is appropriate to all these different types of production conditions. There is little doubt that mass production conditions are most suitable for payment-by-results, although in certain cases the time-rate system may be equally effective. Where the plant is so highly mechanised that the individual worker has little or no control over his speed of working - if he is working on a conveyor belt, for example - there is little point in putting in a wage system designed to give an incentive to increased output. In this case, the most appropriate arrangement is to have a system of day-work plus merit rating. In this way there is an incentive to good, conscientious work of high quality, for all the

factors determining the value of an employee to his firm are taken into consideration.

What of those many cases in which the worker in a mass production plant can directly influence the volume of his output? There is no doubt that individual response is best evoked by individual incentive. Whilst group incentives have a definite part to play, and offer distinct advantages, it is nevertheless true that where quantity of output is of vital importance, and where proper control over quality can be maintained, the individual incentives are most effective. It has been said that individual incentives, by reason of the differences in earnings which they afford to different workers, cause envy, jealousy and strife. If this is so, it is usually the result of bad rate-fixing; either the base-rates do not properly reflect the value, degree of difficulty, dirtiness, arduous nature, etc. of the various jobs, or else the time-studies have been so badly done that rates are either "loose" or "tight" so that some employees have an easy time whilst others have to work hard to earn bonus. There is no doubt whatsoever that rate-fixing must be accurate if an individual incentive system is to work satisfactorily.

Of the individual incentives, piece-work is without question the most satisfactory. The British premium bonus systems, and the more complicated American sharing-plans all suffer from the fundamental defect of a piece-rate which falls as output increases. Indeed there is much to be said for a piece-rate which rises with increasing output,

along the lines of the Merrick system discussed in the latter part of chapter twelve. If the guaranteed minimum time-rate is added to this multiple piece-rate plan, it approaches very closely to the ideal individual incentive. The initial standard should be such that the learner on the job is encouraged from the very beginning. Above this there should be a series of progressive standards, well within the capacity of the average worker operating at a reasonable intensity of effort. The constantly rising piece-rate gives to the keen ambitious worker a sense of continual progress, which stimulates the will to work and maintains the incentive, so that there is less danger of his settling down at a rate of output less than the optimum. The multiple piece-rate plan gives the strongest possible incentive to increase output even at high productions, and it combats the natural tendency for interest to flag as output goes up and each successive increment requires the expenditure of more and more energy. The method does, of course, involve the employer in rising labour costs per unit, but this may be well worth while where the plant is highly mechanised and the chief cost of production lies in the running of the machines rather than the payment of the labour force.

Experience over the past few decades with the various point premium plans such as Bedaux and Haynes has something to offer also. In the first place, they place an

emphasis upon the value of time-study for rate-fixing purposes, and there is little doubt that, so long as it is operated fairly and with proper safeguards, this method can give more accurate results than any other system of rate-fixing. Since a high-task, high-reward multiple piece-rate system demands accurate rate-fixing, time-study clearly has an important part to play in the ideal incentive plan for standardised, mass production conditions. This contention is by no means an endorsement of the Bedaux claim to be able to calculate with scientific accuracy the effort involved in, and the relaxation required for, any operation. Indeed, considerable doubt has been expressed regarding the technique of effort-rating, and it is suggested that a more satisfactory result is arrived at by taking several time-studies on each of a number of average workers, and selecting the natural timing for that particular job. Base-rates, properly fixed on the basis of job-analysis, can then reflect the different values of and degrees of effort required by, the various jobs.

Again, the value of expressing piece-work prices in terms of some point or unit other than money is considerable, from the point of view of production control, costing, and adjustment of base-rates. It is suggested that the simplest and most satisfactory unit is time, and that piece-work prices should be expressed in "standard hours", a unit which can be used as a common denominator for all kinds of labour for purposes of production control and costing, and a unit which is not affected by changes in base-rates.

The conclusions regarding mass production conditions are therefore, twofold, viz. (i) Where the worker has little or no control over his speed of working, the appropriate method of wage payment is daywork plus merit rating. (ii) Where the worker can control his output, the best system is probably a hybrid, a multiple piece-rate plan, the prices being expressed in terms of "standard hours" and established by means of time-study; base-rates should be fixed by means of job analysis.

(b) Batch and
Job Production

Although the individual incentive is undoubtedly the most powerful, group incentives are applicable to certain sets of circumstances. Where the unit of production is the team or squad rather than the individual, and all share in the production of a product which is easily measurable, then group piece-work is the appropriate method of payment. Both the purpose and the results of group piece-work are the same as those of individual piece-work; the only difference is that the incentive power of the former is inevitably somewhat less than that of the latter. Since a man's bonus depends partly on what his colleagues are doing as well as on his own efforts, the group should be as small and as homogeneous as possible. This is difficult of attainment in these days of high labour turnover and absenteeism.

In batch and job production plants, the cost of administering a piece-work system may be disproportionately

high. Where output is constantly changing from one product to another, frequent time studies become necessary for rate-fixing purposes, and this may be so expensive as to be unjustifiable. Again, the costs of keeping piece-work records - of workers' output of the various products, and of time spent in changing over, re-setting machines and so on - will be unduly inflated. A batch production plant must be flexible, but piece-work tends towards rigidity. For workers dislike changing over from one job to another, since, by breaking their rhythm of work, their bonus may suffer.

For these reasons, a production bonus system may be more suitable for many batch and job production plants than either individual or group piece-work. By this method, all the different products manufactured in the plant may be reduced to the lowest common denominator of "value", and when the value of the output rises above a certain datum line an appropriate percentage bonus will be paid on the salaries or wages of all members of the staff. In this way, a greater degree of team-spirit and co-operation may be infused into the undertaking, and an incentive to greater output incorporated into the time-rate system.

(c) Process
Work and Indirect
Labour.

Furthermore, the production bonus method solves the problem of remunerating indirect labour and those employed on what has been termed process work. All

the employees, irrespective of their duties, and whether or not their output can be measured or controlled, receive the same percentage rate of bonus on their time-rates. In this way the unity of the whole organism is emphasised and a premium placed upon co-operation, although it must be admitted that group schemes can never have the same incentive power as individual schemes. The choice largely depends upon the type of work; where the emphasis is upon volume of output, and the latter can be measured, individual incentives are to be preferred. Where, however, individual output is not easily measurable, or the emphasis is upon team-work, group incentives may be more suitable.

Merit-rating.

Although in our present desperate economic straits quantity of output rightly assumes a position of great importance, it is not all-important. Indeed, it is largely the quality of British goods rather than their cheapness which has enabled this country to compete in the world markets against the flood of American mass-produced articles. It is one of the disadvantages of payment-by-results that its emphasis is upon quantity rather than quality, but merit rating is not subject to the same criticism. It takes into account not only quantity of output, but also all those other factors which contribute to employee-value, and, properly conceived and administered, it can help considerably in the development of good team spirit and will-to-work within the organisation.

For those processes in which quality of workmanship is just as important as quantity of output, and especially where the measurement of output is difficult, merit rating has undoubtedly much to be said in its favour. Wherever conditions or type of work preclude the adoption of payment-by-results, so that the time-rate system has to be applied, the latter should be supplemented by a good merit rating system, which will serve to introduce some measure of financial incentive and to maintain keenness and initiative by assuring workers that they will be remunerated according to the ability which they shew.

Profit-sharing and Co-Partnership. Profit-sharing and co-partnership have had a very chequered history in this country, and a good deal of criticism - much of it justified - has been levelled against them. Some of this criticism, however, has been misplaced, as, for example, when it has been said that profit-sharing has very little incentive value. That is perfectly true, but it is also a truism, for profit-sharing is not a system of payment-by-results in the accepted sense of the term, and its proper function is not that of offering a financial incentive. The true function of profit-sharing, and even more so of co-partnership, is the promotion of happier relations between employer and employee by giving to the worker that sense of "belonging" which he so sadly lacks in the majority of industrial plants. The worker is informed of the financial position of the firm, he

shares in its profits and perhaps in its ownership and control; he is no longer merely a hand but a co-partner in the business. Under favourable conditions, a well designed and administered co-partnership scheme can be an admirable supplement to the more direct financial incentives. Perhaps this is at least part of the answer to the endless controversy between the protagonists of individual and group incentives. It has often been claimed that individual incentives are anti-social and that they defeat their own ends by disrupting those group loyalties which are so essential to good industrial relations and ultimately to efficiency of production. On the other hand, two vitally important contentions can hardly be denied, viz. (a) the urgent need for increased output, and (b) that individual response is best invoked by the individual incentive. Is it a possible function of co-partnership in the future to prevent the disruption of group loyalties by individual incentives, so that the two methods together may give both maximum output and also good working relationships? What is quite certain is that a spirit of co-operation within the business is absolutely essential to success, and however good technically a system of wage payment may be, if it has not the confidence and goodwill of all concerned it is doomed to failure.

The need for co-operation as well as technical excellence requires to be constantly re-emphasised.

As Professor Elton Mayo puts it: "Technical progress and technical organisation have enabled the democracies - the 'plutodemocracies' of Mussolini and Hitler - to develop, for the most part, beyond an ignorant and peasant type of living, to improve at least to some extent the general material standards of society. But we have failed to develop at an equal step the strategy of co-operation; we have allowed ourselves the easier path, the strategy of hate, that leads inevitably to the City of Destruction.... Hitler - a tatterdemalion exponent of hatred - led a nation, perhaps the most technically competent in the world, into a morass of hate and misery. The democracies have attained a high level of technical competence and are justly proud of the achievements of 'Science'. Yet physics, chemistry, biology, are wholly unaware of the part they have played in the destruction of society. If our social skills had advanced step by step with our technical skills, there would not have been another European war. 'Patriotism is not enough; we must have no hatred or bitterness towards anyone.'" (1)

(1) Elton Mayo: "Social Problems of an Industrial Civilisation" Harvard. 1945.

APPENDIX "A".

PIECE-WORK - QUALITY CONTROL.

APPENDIX A(1)

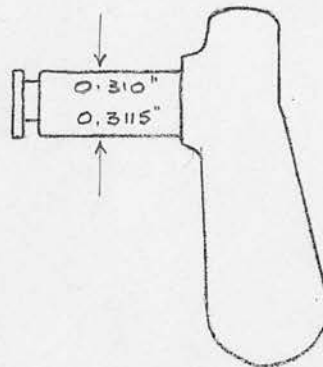
Data Sheet for Quality Control.

Contract No.	Drawing No.	Component	Operation No.	Dimension	M/c Type & No.	Dept.	Prod. Rate	Sampling	Sheet No.
Shift and Date									
Time									
<div style="display: flex; justify-content: space-between;"> 1 2 3 4 5 </div>									
<div style="display: flex; justify-content: space-between;"> Individuals in Sample </div>									
TOTAL									
MEAN									
RANGE									
Insp. No.									
Oper. No.									
Sett. No.									
<div style="display: flex; justify-content: space-between;"> AVERAGE } $\bar{W} =$ Limit on Range } $D\bar{W} =$ Action Limits } $+ -$ on Mean </div>									
<div style="display: flex; justify-content: space-between;"> Upper Control Limit Lower Control Limit </div>									
REMARKS:									

QUALITY CONTROLTEST PLUNGER LATCH

This is a die-cast product, and the operation under control is the turning of the 0.3115-0.310" diameter.

Investigation into the high range and variations on the mean revealed that variation was due to slight differences in the shape and size of the component where it was held in the special collet. By sorting the components into their respective groups, i.e. No. 1, 2 or 3 mould, a more consistent product was achieved, as evidenced by the chart.



CONTRACT No.

MARK III

DRAWING No.

10763

DESCRIPTION

TEST PLUNGER
LATCH.

DIMENSIONS

3115
310

M/c. No. & DEPT.

MINORON 364

40V

PRODUCTION RATE

56 P.H.

No. IN SAMPLE

5

SAMPLING INTERVAL

1. HOUR.

TEST INSTRUMENT

MICROMETER.

SCALE OF CHARTS

189.0001.

CHART No.

APPENDIX "A"(2)

Photographic copy of an actual
Quality Control Chart.

Test Plunger Latch

MEANS OF SAMPLES OF FIVE.

---TOLERANCE---

---CONTINUAL---
LIMITS.

RANGES OF SAMPLES OF FIVE.

---LIMIT ON
---LIMIT ON

• TIME

DATE

OPERATOR'S

SETTER'S No.

INSPECTOR'S

INSPECTOR'S No.

DRAWING No.

DESCRIPTION

DIMENSIONS

APPENDIX A(3)

This is an actual blank control chart shewing the ruling which does not come out clearly on the photographic copy in Appendix A(2).

M/c. No. & DEPT.

PRODUCTION RATE

No. IN SAMPLE

SAMPLING INTERVAL

TEST INSTRUMENT

SCALE OF CHARTS

CHART No.

TIME

DATE

OPERATOR'S No.

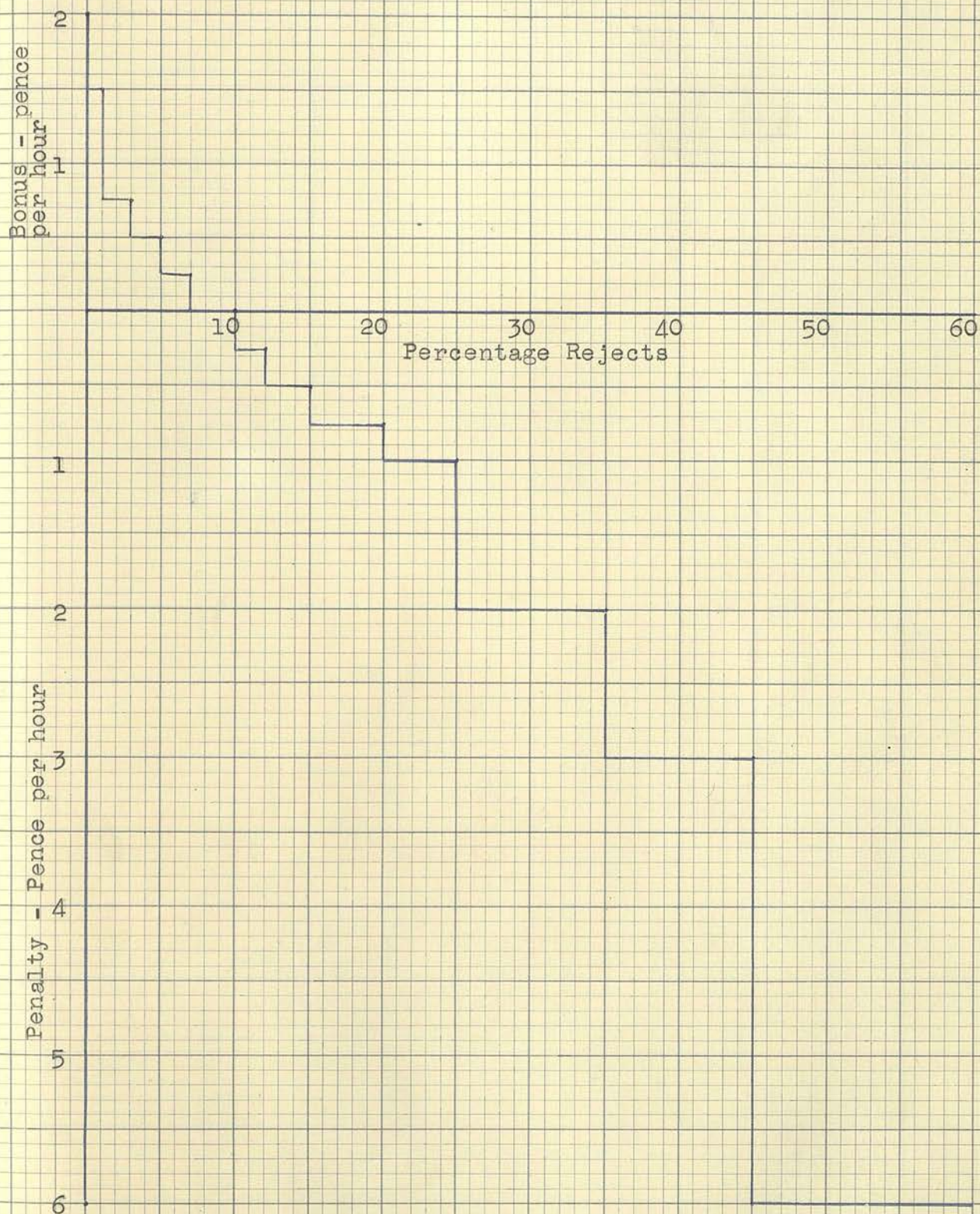
SETTER'S No.

INSPECTOR'S No.

1. The first thing I noticed
was a strong smell of the sea.

THE
END

THE
END

APPENDIX "A"(4)Graphical Representation
of Quality Bonus Scheme

Extract from Industrial Court Award No. 70
of 8.7.1933 applying to wages of Railway Workers.

13. FIXTURES AND OTHER SYSTEMS OF PAYMENT

(1) All prices, whether existing at the date of the coming into operation of this Decision, or otherwise, as provided in paragraph 13, or any prices, shall be such as to yield to the normal worker not less than 33-1/3% per cent on the worker's time or day rate (excluding war wages or bonus);

APPENDIX "B".

PIECE-WORK - RATE-FIXING.

any time or day rate as provided for, such agreement shall not be interfered with by this Decision.

(ii) Where, under this Decision, the time or day rate has been altered, the price shall be adjusted so as to yield to the normal worker not less than 33-1/3% per cent on the worker's time or day rate (excluding war wages or bonus).

(iii) No piece-work price shall be altered with the above provisions shall be altered price and material, nature or method of production is changed.

(iv) The above provisions shall apply as nearly as practicable to the method of fixing price under any other system of payment by results.

(v) The provisions set out in the foregoing paragraphs shall apply as nearly as practicable to the method of

Extract from Industrial Court Award No. 728
of 8.7.1922 applying to Wages of Railway Shopmen.

12. PIECEWORK AND OTHER SYSTEMS OF PAYMENT BY RESULTS.

(i) All prices, whether existing at the date of the coming into operation of this Decision, as provided in paragraph 40, or new prices, shall be such as to yield to the normal worker not less than 33-1/3rd. per cent on the worker's time or day rate (excluding war wage or bonus); but where, under any written agreement between any Union and a Railway Company, a larger percentage over the time or day rate is provided for, such agreement shall not be interfered with by this Decision.

(ii) Where, under this Decision, the time or day rate has been altered, the prices shall be adjusted so as to yield to the normal worker not less than 33-1/3rd. per cent on the worker's time or day rate (excluding war wage or bonus).

(iii) No piece-work price which complies with the above provisions shall be altered unless the material, means or method of production is changed.

(iv) The above provisions shall apply as nearly as practicable to the method of fixing prices under any other system of payment by results.

(v) The provisions set out in the foregoing paragraphs shall apply as nearly as practicable to the method of

of fixing prices for gang or squad workers; that is to say, prices shall be so fixed as to enable each member of the gang or squad to earn not less than 33-1/3rd. per cent on his time or day rate (excluding war wage or bonus).

(vi) Where any alteration is hereafter made in the price payable to a gang or squad the price shall be so divided as to yield to each member of the gang or squad his appropriate proportion of the price as altered.

(vii) Where any alteration is hereafter made in the time or day rate of any member of the gang or squad, the price payable to the gang or squad shall be so adjusted that the portion of the price payable to the member whose time or day rate has been altered will yield not less than 33-1/3rd. per cent on such altered time or day rate (excluding war wage or bonus).

(viii) The intention of the above provisions is that where men work in gangs or squads each member shall be in a position to earn the requisite percentage over his time or day rate.

13. PIECEWORK AND OVERTIME, NIGHT WORK, SUNDAYS, HOLIDAYS, ETC.

Overtime rate for pieceworkers shall be the extra rate paid to day or time workers under Clause (a) of paragraph 3 of these Conditions if overtime falls within the day period, and under Clause (b) of the same paragraph if overtime falls within the night period; and in the case of piece-workers working on Sundays, Good Friday, Christmas Day, and Bank

and Public Holidays the rate in addition to the piecework earnings shall be the extra time or day rate paid to time or day workers on any of those respective days.

14. LIEU WORK.

Wherever possible lieu rates shall be abolished and a system of payment by results shall, where practicable, be substituted for the lieu rate system.

conditions as substituting, in so far as they apply, the respective working conditions as present in operation.

The parties further agree that any agreements at present in operation governing working conditions shall be modified in so far as the undersigned provisions conflict with the provisions of such agreements.

SYSTEM OF PAYMENT BY RESULTS.

(a) All system of payment by results will be subject to the following conditions:-

No piecework prices, bonus or basic rates once established may be altered except for the following reasons:-

(1) A mistake in the calculation on either side, or

(2) The material, mode or method of production or the quantities are changed, or

(3) A mutual arrangement has been come to between the employer and the worker in the same way as a new price is arranged.

(b) Piecework prices and bonus or basic rates shall be such as will enable a workman of average ability to

Extract from Memorandum of Agreement between the Engineering and Allied Employers' National Federation and the Engineering Joint Trades Movement - 23rd. June, 1931, whereby the Joint Recommendation of 19th. and 20th. June, 1931, is adopted as follows:-

The parties mutually recommend to their respective constituent bodies acceptance of the undernoted working conditions as substituting, in so far as they apply, the respective working conditions at present in operation.

The parties further agree that any Agreements at present in operation governing working conditions shall be modified in so far as the undernoted provisions conflict with the provisions of such Agreements.

SYSTEMS OF PAYMENT BY RESULTS.

(a) All systems of payment by results will be subject to the following conditions:-

No piecework prices, bonus or basis times once established may be altered except for the following reasons:-

- (1) A mistake in the calculation on either side, or
- (2) The material, means or method of production or the quantities are changed, or
- (3) A mutual arrangement has been come to between the employer and the worker in the same way as a new price is arranged.

(b) Piecework prices and bonus or basis times shall be such as will enable a workman of average ability to

earn at least 25 per cent* over time rates, excluding War Bonus.

(c) As regards existing prices or times:-

(1) In those cases where the basis is 33-1/3rd. per cent it will be reduced to 25 per cent* i.e., a reduction of 6 1/4 per cent.

(2) In those cases where the basis is by Agreements or recognition greater than 33-1/3rd. per cent, the reduction will be in the ratio of 33-1/3rd. to 25%*.

- (1) Machine or other equipment,
- (2) Material used,
- (3) Process or method of manufacture, or
- (4) Other conditions.

Wherever it is agreed that standards have been

*(Increased to 27 1/2% by National Arbitration Tribunal Decision of March 1943.)

Subject to what has been said above, the company

guarantees that the standard output required to earn standard piece or bonus shall be made available to the worker (including all existing jobs for which the final rate has not yet been set) will be similarly guaranteed when sufficient time and practice have been allowed for acquiring normal skill at the job."

Source: Document "The Human Factor in Business" pp. 51-52

APPENDIX "B" (3)RATE-CUTTING GUARANTEE
AT ROWNTREE WORKS.

The following was agreed to between management and labour, and is embodied in the List of Rules:-

"Existing rates (standard of output) will not be altered unless it is agreed with the workers' representatives that a change affecting the rate of output attainable for the same effort has taken place in -

- (1) Machine or other equipment.
- (2) Material used.
- (3) Process or method of manufacture, or
- (4) Other conditions.

Wherever it is agreed that a mistake has been made in the setting of a rate, correction will be made without delay.

Subject to what has been said above, the company guarantee that the standard output required to earn standard piece or bonus money will remain unaltered except as provided above, and that standard outputs on new jobs (including all existing jobs for which the final rate has not yet been set) will be similarly guaranteed when sufficient time and practice have been allowed for attaining normal skill on the job."

Source: Rowntree: "The Human Factor in Business" pp. 51-52.

APPENDIX "B" (4)Extract from "Evershed" Report on
the Cotton Spinning Industry 1945.

"A system of time rate minima supplemented, where appropriate by piece rates is in our judgment best adapted to provide on the one hand a just measure of security for the operative and at the same time an incentive towards the increased production which is so pressing a need.....

Our principal difficulty has been to arrive at a conclusion (in cases to which piece rates are applicable) upon the proper relationship between the time base minimum and the piece rate on which the earnings of the operative of average skill and industry in a normal week would be calculated. We have considered particularly the engineering and other trades in which the piece rates are so calculated that operatives of average skill will expect to earn wages equivalent to various percentages in excess of the time base minima.

It is clear, on the one hand, that the time base minimum must be such as in itself to constitute an adequate and satisfactory wage, acceptable as such, when for reasons outside the operative's control the opportunity of earning the piece rate wage is denied to him or her. Moreover, we are anxious that the time base wage should in effect provide a "guaranteed week" for the operative who is ready and willing to work and this will follow where the operative is employed by

the week, for in such cases unless and until a clear week's notice has been given and taken effect, the operative, if ready and willing to work, will be entitled to receive the minimum or basic wage.

On the other hand the piece rate must be such as to form a real incentive to effort and production.

28. In balancing these considerations it is necessary to bear in mind the circumstances of the spinning industry - particularly the important circumstance that the amount of production of yarn is determined by the spinning machine which, save when stopped for doffing or cleaning or other incidental stoppages, continues throughout the whole period of the working week at a uniform speed adapted to the count of yarn being spun. Increased production from the machine can therefore be attained by the operative only (substantially speaking) as a result of shortening the times taken for the operations which require the machines to stop. Similar considerations apply in the cases of other operatives for whom piece rates are appropriate.

Generally speaking therefore the possible variations in production depending upon the effort or lack of effort on the operatives' part are limited by comparison with some other industries. With this factor in mind and attaching the importance we do to the claim of security, we have reached the conclusion that the

proper relationship between the piece rate and the time base minimum will be expressed by calculating the piece rate earnings of an operative of average skill and industry in a normal week to yield a wage of not less than 20 per cent above the time base minimum. We have agreed that the time rate minimum shall in general be applicable in the case of all stoppages arising from causes beyond the control of the operative, save that such stoppages amounting to four hours or less in any week shall be paid for at production rates.

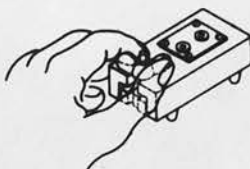
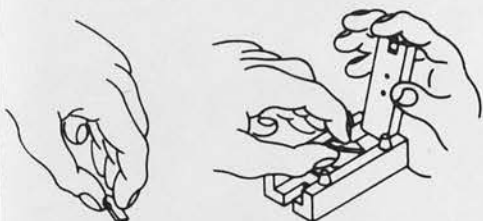
Pictorial diagram shewing
division of operation into
elements for time-study purposes.
(a) Drilling Operation.

BASIC TIME = .120 MINUTES

PICK UP PIECE
FROM TRAY OR BOX.

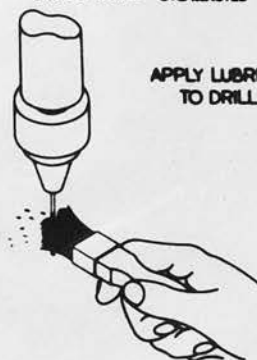
LOCATE PIECE IN DRILL JIG.

FASTEN DRILL JIG.

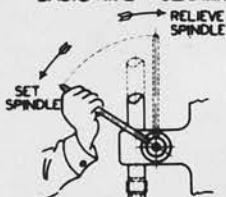


BASIC TIME = .013 MINUTES

APPLY LUBRICANT
TO DRILL.



BASIC TIME = .020 MINUTES



GRASP DRILL HANDLE.
SET SPINDLE TO WORK.
RELIEVE SPINDLE FROM WORK.
RELEASE DRILL HANDLE.



BASIC TIME = .015 MINUTES



DRILL ONE HOLE
1/20 DIA X 1/8 DEEP.



BASIC TIME
= .010 MINUTES

RE-POSITION JIG
TO DRILL 2ND HOLE.

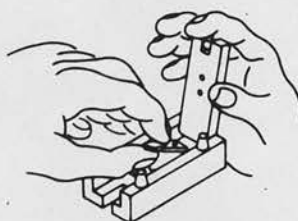
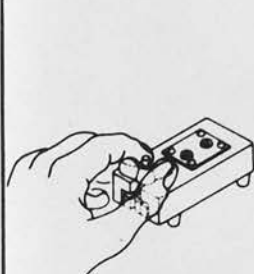


BASIC TIME = .076 MINUTES

RELEASE JIG FASTENING.

REMOVE PIECE FROM JIG.

PLACE PIECE ASIDE
IN TRAY OR BOX.

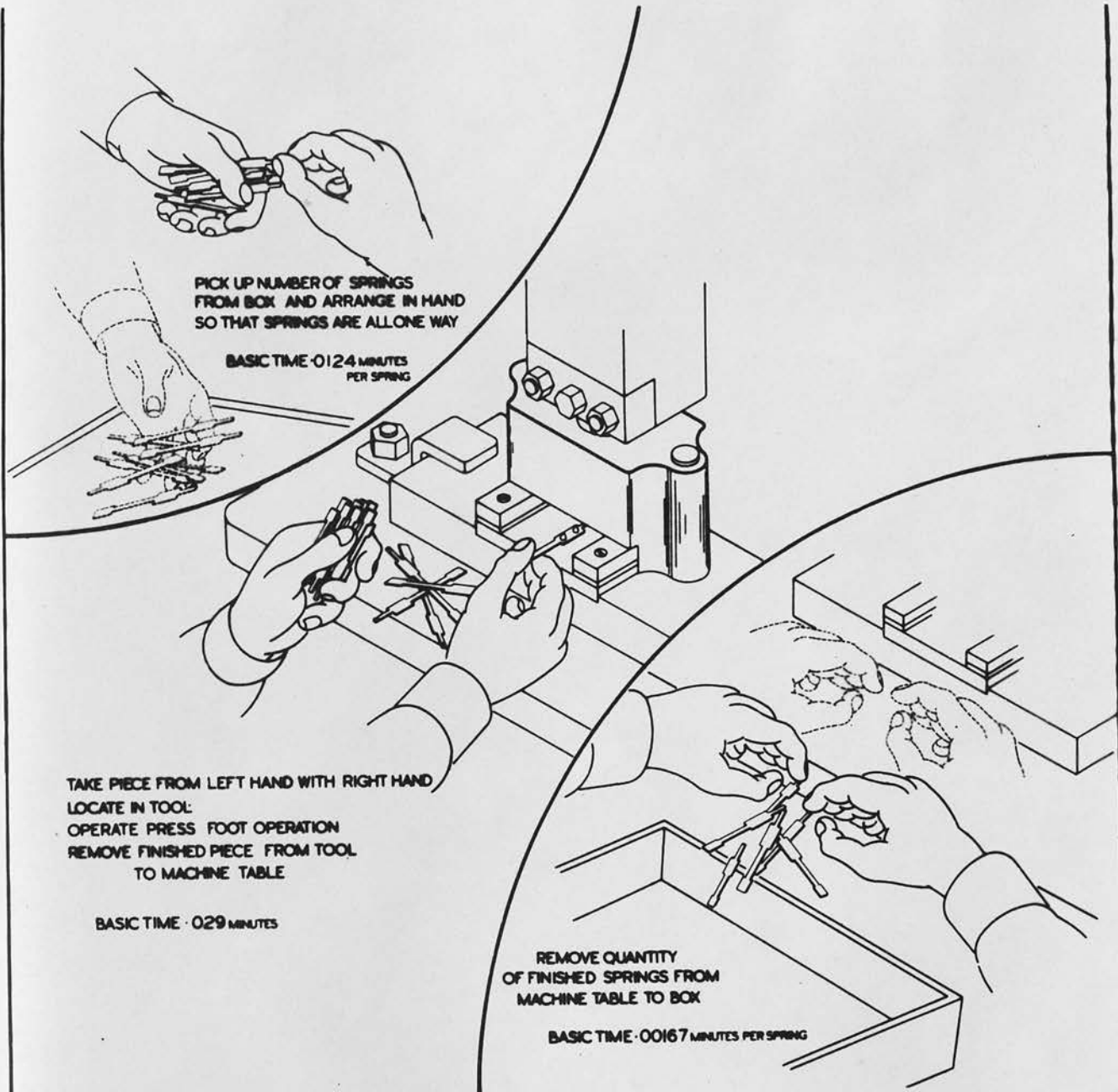


BASIC TIME = .043 MINUTES

PICK UP AIRPISTOL.
CLEAN SWARF FROM JIG
WITH AIRBLAST.
PLACE AIRPISTOL ASIDE.



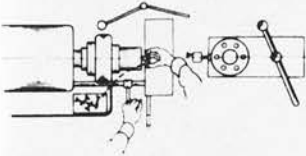
Pictorial diagram shewing
division of operation into
elements for time-study purposes.
(b) Forming Operation.



Pictorial diagram shewing
division of operation into
elements for time-study purposes.
(c) Capstan Operation.

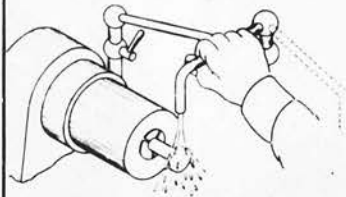
BASIC TIME :058 MINUTES

PICK UP PIECE FROM TRAY
LOCATE IN CHUCK
CLOSE CHUCK



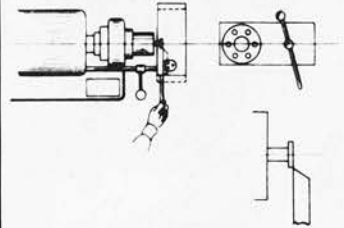
BASIC TIME :020 MINUTES

POSITION COOLANT SUPPLY TO WORK



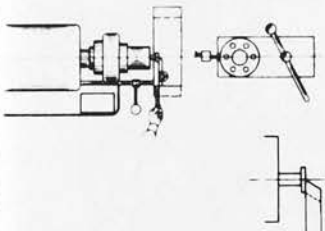
BASIC TIME :018 MINUTES

ADVANCE CROSS SLIDE TO WORK
(FRONT TOOL)



BASIC TIME :157 MINUTES

OPERATE TO FACE WORK

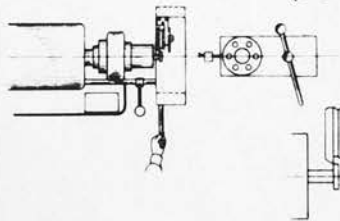


BASIC TIME :010 MINUTES

RETURN CROSS SLIDE FROM WORK
(FRONT TOOL)

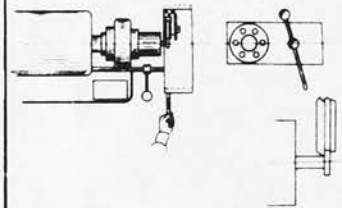
BASIC TIME :020 MINUTES

ADVANCE CROSS SLIDE TO WORK
(BACK TOOL)



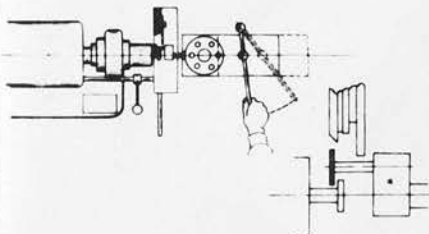
BASIC TIME :131 MINUTES

OPERATE TO FACE WORK (BACK FACE)
& FORM OUTSIDE DIAMETER



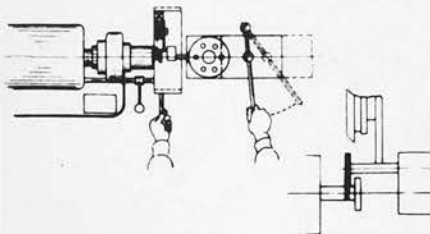
BASIC TIME :016 MINUTES

ADVANCE & POSITION SWING TOOL (KNURL)



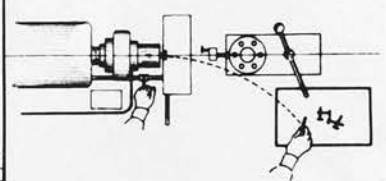
BASIC TIME :049 MINUTES

OPERATE TO KNURL



BASIC TIME :025 MINUTES

OPEN CHUCK
REMOVE PIECE FROM CHUCK
& PLACE ASIDE TO TRAY OR BOX



Extract from: SCHEDULE of Moulding Rates mutually agreed between the National Light Castings Ironfounders' Federation and the Amalgamated Union of Foundry Workers and the National Union of Stove Grate and General Metal Workers to come into operation in respect of work done on and as from MONDAY, 24th. FEBRUARY, 1947.

I. PIPES

(A) Rain Water Pipes.

(1) Round Rain Water Pipes (without Ears) - per
6 ft. length ... Each.

Size		Size		Size	
1½"	9 ⁷ / ₈ d.	3½"	11 ¹ / ₄ d.	6"	1/9 ¹ / ₈ d.
2"	9 ¹ / ₂ d.	4"	1/- ⁵ / ₈ d.	7"	2/8 ¹ / ₄ d.
2½"	9 ¹ / ₂ d.	4½"	1/2 ¹ / ₄ d.	8"	3/1 ⁷ / ₈ d.
3"	10 ¹ / ₈ d.	5"	1/4 ⁷ / ₈ d.		

EXTRAS ON ROUND RAIN WATER PIPES.Faucet Branches cast-on:-

Up to 4"	...	...	...	...	...	1/3 ⁵ / ₈ d. ea.
" 4½"	...	...	...	...	...	1/5 ⁷ / ₈ d. "
" 5"	...	...	...	...	...	1/8 ³ / ₈ d. "
" 6"	...	...	...	...	...	1/11d. "

Spigot Branches cast-on:-

Up to 4"	5 ³ / ₄ d. ea.
" 4½"	7d. "
" 5"	8 ¹ / ₄ d. "
" 6"	9 ⁵ / ₈ d. "

Plain Cuts:-

All sizes	3 ³ / ₈ d. ea.
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Cuts on 7" and 8" sizes:-

Pipe cast to exact length by stopping up remainder of box with sand	1 ¹ / ₄ d. per cut
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Extract from: TYNE AND WEAR RIVETERS' PIECE WORK PRICE LIST.

No.	Description of Work	$\frac{5}{8}$ " per 100	$\frac{3}{4}$ " per 100	$\frac{7}{8}$ " per 100
1.	<u>Bulb Angle, and Angle Beam Knees, Welded ends</u> do. Plate Knees do. do. Following Machine	11/9 10/1 11/9	13/6 11/10 13/6	15/3 13/7 15/3
2.	<u>Beam Knees, Channel Section,</u> Welded Ends do. Plate Knees do. do. Following Machine	11/9 10/1 11/9	13/6 11/10 13/6	15/3 13/7 15/3
3.	<u>Bulb Plate Beam Knees,</u> Welded Ends do. Plate Knees do. do. Following Machine	11/9 10/1 11/9	13/6 11/10 13/6	15/3 13/7 15/3
4.	<u>Beam Knees in Fore and Aft Peaks, when done alone or with the rest of the work in Peaks, all sizes.</u> NOTE: If done with Deck Beam Knees, ordinary Beam Knee price to apply.	- -	16/8	-
5.	<u>Beam Knees, Forecastle and Poop, Riband to be kept clear of the Beam Knees.</u>			
6.	<u>Beam Knees, Odd Beam Knees, all sizes</u> NOTE: Number of Knees deemed odd, to be left an open question between Foreman and Men.	-	20/0	-

APPENDIX "B" (11)

Extract from: CLYDE RIVETERS' PIECE-WORK PRICE LIST
NEW WORK
(Hand Riveting-Iron Rivets)
1926.

No.	Description of Work	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"	$1\frac{1}{8}$ "	$1\frac{1}{4}$ "	No.
1.	Ash Shoots:-							
	(a) Done on ground,	16/-	16/8	17/2				1
	(b) Built in Ship,	19/6	20/3	21/-				
2.	Ash Shoot Castings, Bunker or Casing Ring and Deck Castings,	33/4	33/4	33/4				2
3.	Auxiliary Machinery Seats,	16/8	18/9	20/10	23/-			
	Foundation Bars -							
	(a) Rivets through tank top,	22/6	25/-	27/6	30/-			
	(b) Rivets through vertical flange, done with seats or done alone -							
	Single bars,	16/8	18/9	20/10	23/-			
	Double Bars,	21/3	23/4	25/6	27/6			

Assume: (1) Time set as is to
earn 25 per cent over time-wage.

additions are made to the price.

Piece-work 25 per cent; Halcyon

cent; Raven 25-1/2 per cent.

(11) Average and cost

(111) Time-wage is 2/-

Then: (1) Piece price

100 articles

2 articles

Time-wage for

100 articles

Therefore, 2

(11) APPENDIX "C".

PREMIUM BONUS SYSTEMS.

(111) Average and cost

Assume further that:

Worker A (best worker) 100

" B (average) 80

" C (worst) 60

" D (best) 120

" E (average) 100

Assume: (1) Times set so as to enable an average man to earn 25 per cent over time-wage, i.e. the following additions are made to the estimated operation time:-
 Piece-work 25 per cent; Halsey (one-third bonus) 75 per cent; Rowan $33\frac{1}{3}$ rd. per cent.

(ii) Average man can make 100 articles in 40 hours.

(iii) Time-wage is 2/- per hour.

Then; (i) Piece price:

100 articles take 40 hours;

1 article takes 24 minutes;

Time-wage for one article = 9.6d.

Add 25 per cent 2.4

Therefore, piece-price = One shilling.

(ii) Halsey (one-third bonus) time:

100 articles take 40 hours;

Time allowed = 40 plus 30 (75%) = 70 hours.

(iii) Rowan time:

100 articles take 40 hours;

Time allowed = 40 plus $13\frac{1}{3}$ rd.
 ($33\frac{1}{3}$ rd. per cent)

= $53\frac{1}{3}$ rd. hours.

Assume further that:

Worker A (very quick) makes 100 articles in 30 hours;

"	B (quick)	"	"	"	"	35 hours;
"	C (average)	"	"	"	"	40 hours;
"	D (slow)	"	"	"	"	45 hours;
"	E (very slow)	"	"	"	"	50 hours.

Then, wages for 100 pieces:

(i) Piece-work.

Irrespective of time taken, one shilling is paid for each piece; therefore wages = 100 shillings, to each worker.

(ii) Halsey (one-third bonus)

Time allowed = 70 hours;

Worker A	receives	30	plus	$13\frac{1}{3}$	=	$43\frac{1}{3}$	hours	@	2/-	=	$86\frac{1}{3}d.$
" B	"	35	"	$11\frac{2}{3}$	=	$46\frac{2}{3}$	"	"	"	=	$93\frac{1}{3}d.$
" C	"	40	"	10	=	50	"	"	"	=	100/-.
" D	"	45	"	$8\frac{1}{3}$	=	$53\frac{1}{3}$	"	"	"	=	$106\frac{1}{3}d.$
" E	"	50	"	$6\frac{2}{3}$	=	$56\frac{2}{3}$	"	"	"	=	$113\frac{1}{3}d.$

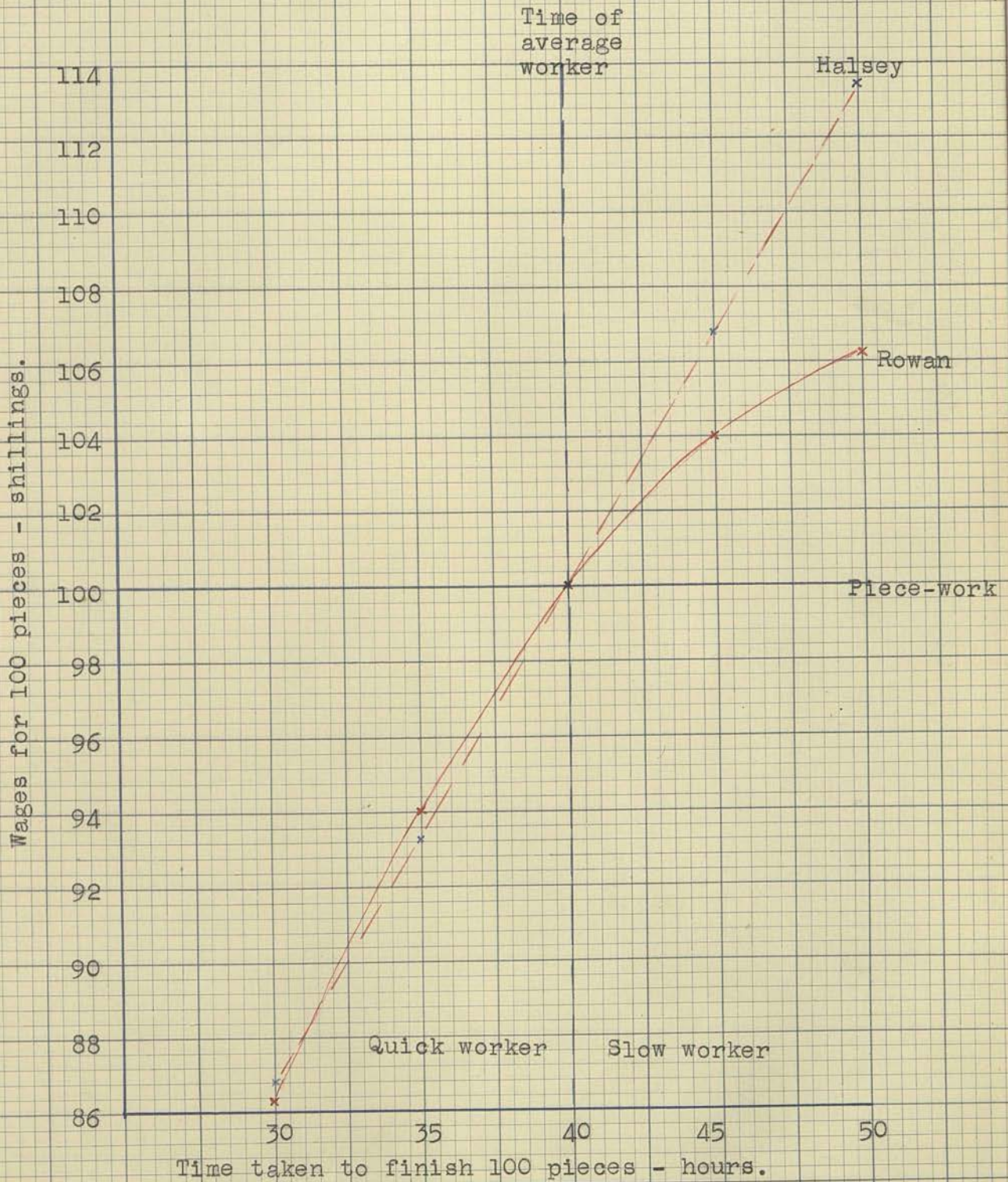
(iii) Rowan:

Time allowed = $53\frac{1}{3}$ rd. hours;

Wage = $\left(\text{Time taken plus } \frac{\text{Time taken} \times \text{Time saved}}{\text{Time allowed}} \right) \times \text{Rate per hour}$

Worker A	receives	30	plus	$\frac{30 \times 23\frac{1}{3}}{53\frac{1}{3}}$	=	$43\frac{1}{3}$	@	2/-	=	$86\frac{1}{3}d.$
" B	"	35	"	$\frac{35 \times 18\frac{1}{3}}{53\frac{1}{3}}$	=	$47\frac{1}{3}$	"	=	$94\frac{1}{3}d.$	
" C	"	40	"	$\frac{40 \times 13\frac{1}{3}}{53\frac{1}{3}}$	=	50	"	=	100/-.	
" D	"	45	"	$\frac{45 \times 8\frac{1}{3}}{53\frac{1}{3}}$	=	$52\frac{1}{3}$	"	=	$104\frac{1}{3}d.$	
" E	"	50	"	$\frac{50 \times 3\frac{1}{3}}{53\frac{1}{3}}$	=	$53\frac{1}{3}$	"	=	$106\frac{1}{3}d.$	

APPENDIX "C"(1) (Continued)



APPENDIX "C" (2)

Variation of Wages per 40-hour week, with Output:

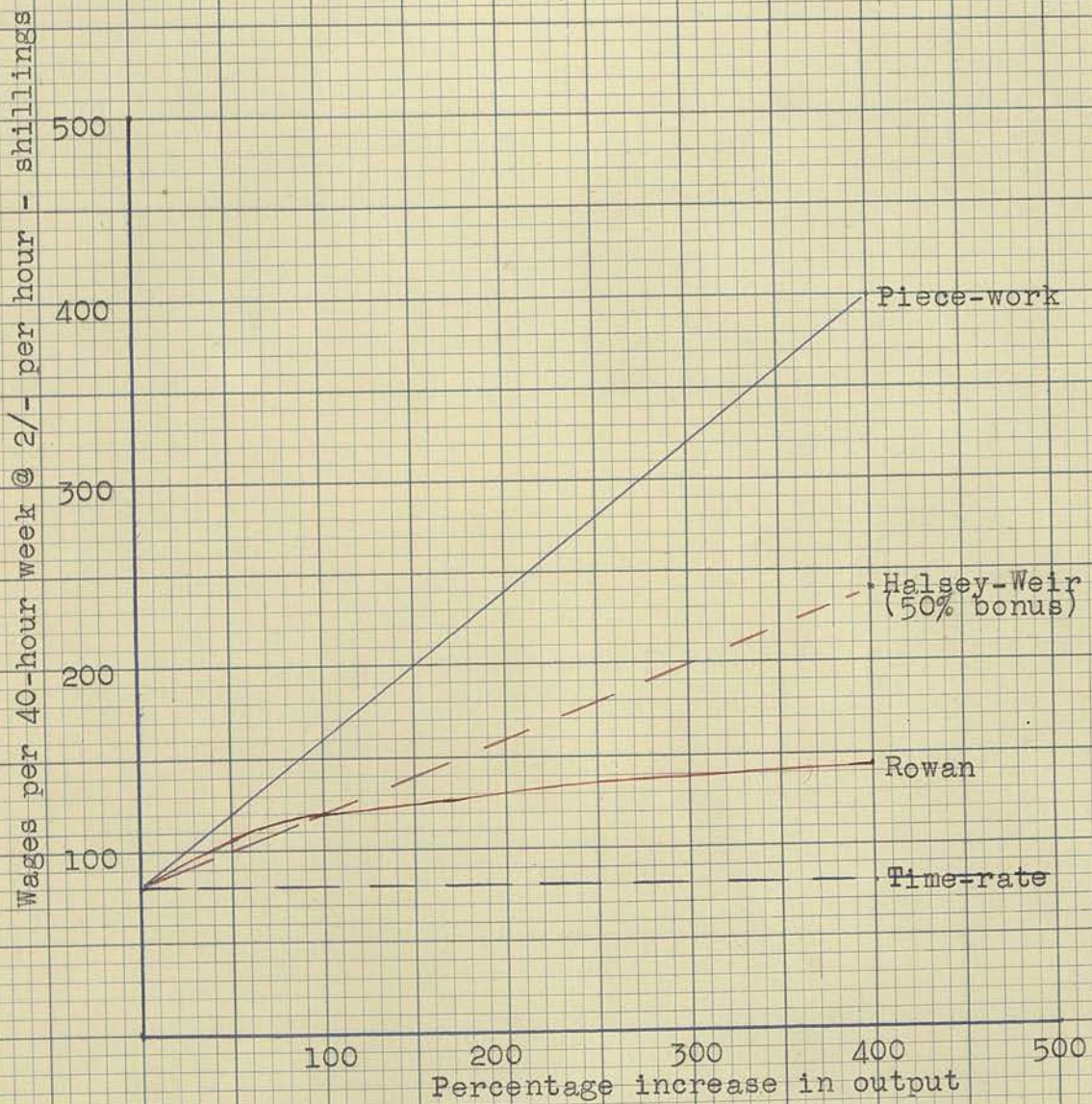
Hours				Incr: ease in Out put (1) %	Halsey-Weir (50%)					Rowan			
Allowed	Taken	Saved			Bonus (hrs.)	Unit Labour Cost (hrs.) (2)	Wages per wk. of 40 hrs. @ 2/- per hour. (3) s. d.		Bonus (hrs.)	Unit Labour Cost (hrs.) (2)	Wages per wk. of 40 hrs. @ 2/- per hour (3) s. d.		
		Hours	Per Cent.				s.	d.			s.	d.	
10	10	0	0	0	0	10	80	0	0	10	80	0	
10	9	1	10	11.1	$\frac{1}{2}$	$9\frac{1}{2}$	84	5	0.9	9.9	88	0	
10	8	2	20	25	1	9	90	0	1.6	9.6	96	0	
10	7	3	30	42.9	$1\frac{1}{2}$	$8\frac{1}{2}$	97	1	2.1	9.1	104	0	
10	6	4	40	66.7	2	8	106	8	2.4	8.4	112	0	
10	5	5	50	100	$2\frac{1}{2}$	$7\frac{1}{2}$	120	0	2.5	7.5	120	0	
10	4	6	60	150	3	7	140	0	2.4	6.4	128	0	
10	3	7	70	233.3	$3\frac{1}{2}$	$6\frac{1}{2}$	173	4	2.1	5.1	136	0	
10	2	8	80	400	4	6	240	0	1.6	3.6	144	0	
10	1	9	90	900	$4\frac{1}{2}$	$5\frac{1}{2}$	440	0	0.9	1.9	152	0	

References: (1) $\frac{\text{Time saved} \times 100}{\text{Time taken}}$

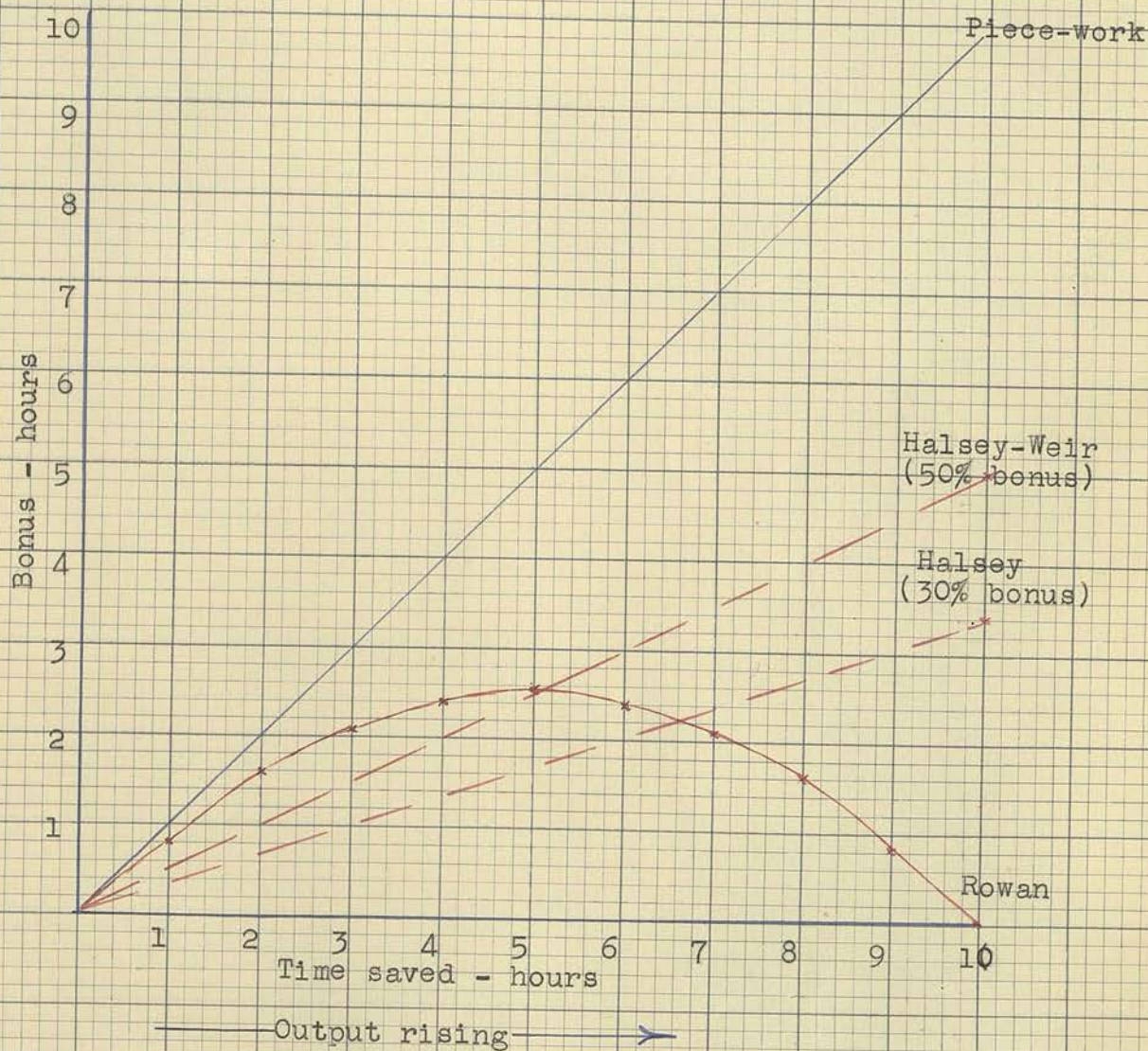
(2) Time taken plus bonus hours.

(3) $\frac{\text{Unit Labour Cost} \times 80/-}{\text{Time taken}}$

Variation of Wages with Output
under Piece-work, Time-rate and
Premium-bonus systems



Graph shewing amount of bonus
in addition to time-wage, on
piece-work and premium-bonus
systems



APPENDIX "C"(3) continued.

It will be noted that the Rowan bonus is more generous than the Halsey-Weir up to 50 per cent of the saving, and more generous than the Halsey up to $66\frac{2}{3}$ per cent of the saving, after which it is less generous. This has sometimes been called the "poor half" of the Rowan curve, and has been the object of criticism. For example, the bonus paid to a man who does the job in 8 hours is the same as that paid to a man who does the job in 2 hours, namely 1.6 hours in each case, and this is considered by some to be unfair to the latter. However, this fast worker does four jobs in the time taken to do one by his slower work-mate, so that he really earns $4 \times 1.6 = 6.4$ hours bonus instead of 1.6 in the same working time.

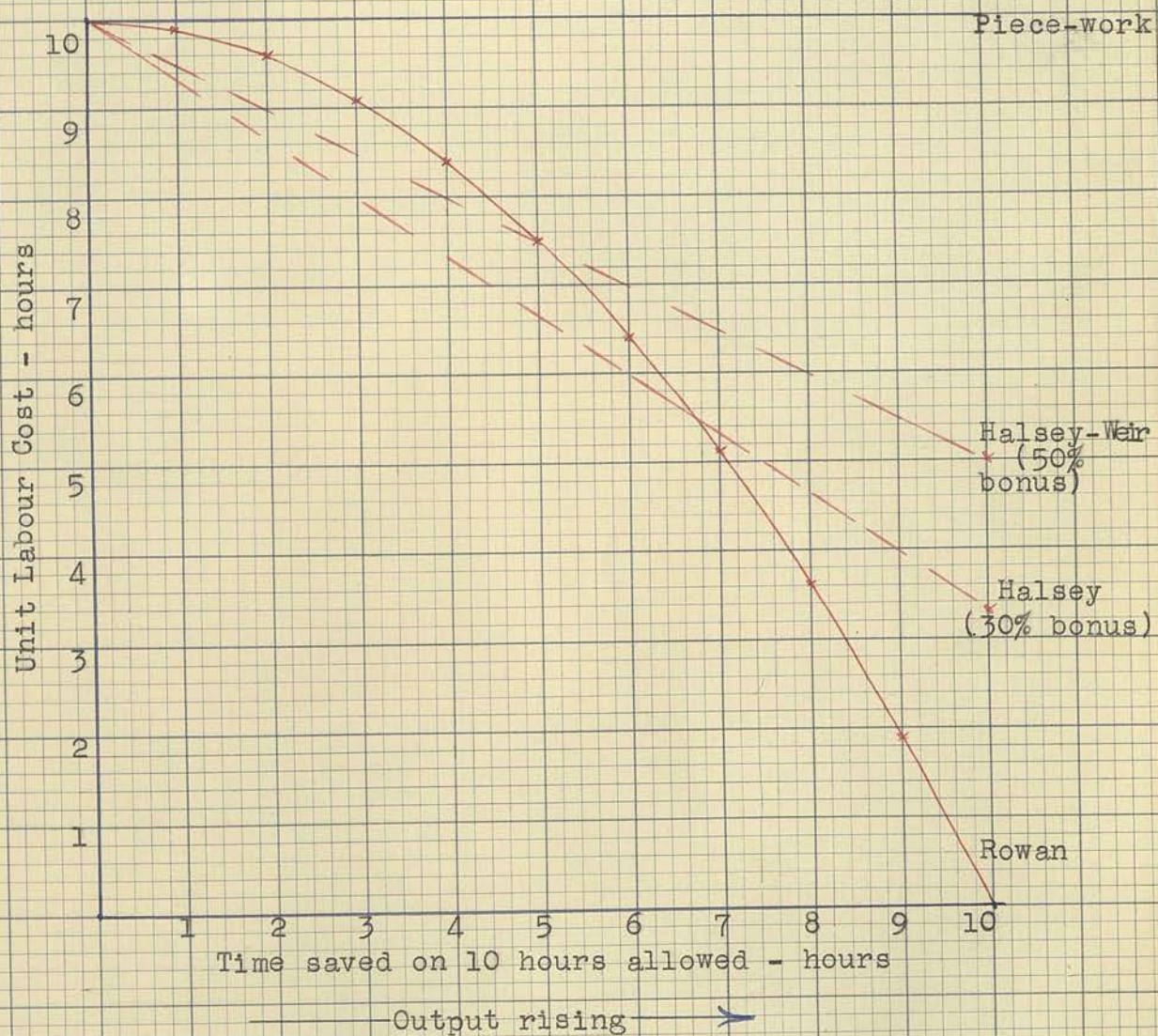
Sir Wm. Rowan Thompson, seeking to refute the criticism of the "poor" half of the Rowan curve, wrote: "There is a general reply to all the alleged defects and academic objections regarding the "poor" second half of the Rowan system. If, as I have urged, there is a limit, even with the assistance of the management, to a man saving more than 50 per cent of the standard time allowance, then what is the use of considering or discussing what does, or does not, take place in the second half of either the Rowan or Halsey scales? It is outside the range of general practice, and there the matter ends." (1)

(1) "The Premium Bonus System" p. 28.

On the other hand, one of the claimed advantages of the Rowan system is that rate-fixing need not be particularly accurate because, after the point of 50 per cent saving, the Rowan bonus, unlike the Halsey-Weir, can never become excessive. Clearly this advantage is meaningless if the case of over 50 per cent saving is in fact "outside the range of general practice". James Rowan himself apparently did not share Sir William's views, for in correspondence with F.A. Halsey he wrote; speaking of the cases of very large time saving:- "You will no doubt remark that these are extreme cases and seldom to be met with, but these are the cases we are aiming at and hope to arrive at some day, although it may be a long way off. When we do arrive at them we will not require to cut the man's rates, but you will and so will Messrs. Weir....There is no getting over the fact that if ever you have to cut rates it tells very much against the premium system. We have never yet cut a rate unless we have made a radical change in the method of doing the work." (1)

(1) Correspondence between Messrs. James Rowan and F.A. Halsey in the columns of the "American Machinist" of 25th. January 1902.

Graph shewing comparison of labour costs under piece-work and premium-bonus systems



It will be seen that the Rowan labour-cost at first rises above the Halsey-Weir and Halsey, but at half and two-thirds respectively it falls below. This shews how that, if rate-fixing is fairly accurate the employer will prefer one of the Halsey systems, since the labour-cost with only small savings of time allowed is less than the Rowan labour-cost. If, however, rate-fixing cannot be, or is not, accurately done, the Rowan system is much safer for the employer for, with large savings of time allowed, labour-cost is less than with the Halsey systems. The graph also illustrates the further advantage of the Rowan system that the employer may be able to introduce new methods involving less time, and yet not require to cut the rate, unless the change is a radical one.

EMERSON EFFICIENCY BONUS SCALE.

Efficiency Computation %	Bonus: % of time wage	Efficiency Computation %	Bonus: % of time wage
67	.01	85	6.17
68	.04	86	6.84
69	.11	87	7.56
70	.22	88	8.32
71	.37	89	9.11
72	.55	90	9.91
73	.76	91	10.74
74	1.02	92	11.62
75	1.31	93	12.56
76	1.64	94	13.52
77	1.99	95	14.53
78	2.38	96	15.57
79	2.80	97	16.62
80	3.27	98	17.70
81	3.78	99	18.81
82	4.33	100	20.00
83	4.92	For every 1% thereafter:	An increase in bonus of
84	5.53		1%

Extracted from the Ministry of Labour Gazette, March 1934
MINISTRY OF LABOUR
Settlement of Dispute at Work of Messrs. Holmer Ltd.

The stoppage of work which commenced on the 12th December 1933 in the Messrs. Holmer Ltd. in the City of London, was a serious one as the company is one of the largest in the City of London and its stoppage would have had a serious effect on the City of London. The stoppage was caused by a dispute between the company and the workers. The dispute was settled by the Ministry of Labour on the 12th February 1934. The settlement was as follows:

APPENDIX "D".

Following terms:-

(1) POINT PREMIUM SYSTEMS.

The Union (The London and Westminster Amalgamated Railway Union) accepted that the sole responsibility for the strike of the 12th December 1933 was with the Railway Company. The Union also accepted that the company was not responsible for the strike. The Union also accepted that the company was not responsible for the strike. The Union also accepted that the company was not responsible for the strike.

(2) WAGE PREMIUM SYSTEMS.

The Union (The London and Westminster Amalgamated Railway Union) accepted that the sole responsibility for the strike of the 12th December 1933 was with the Railway Company. The Union also accepted that the company was not responsible for the strike. The Union also accepted that the company was not responsible for the strike. The Union also accepted that the company was not responsible for the strike.

APPENDIX "D" (1)

Extracted from the Ministry of Labour Gazette, March 1932.

BEDAUX SYSTEM OF WORKS MEASUREMENT.Settlement of Dispute at Works of Messrs. Wolsey Ltd.

The stoppage of work which commenced on 7th. December last at the hosiery works of Messrs. Wolsey Ltd., in Leicester and district, and as a protest against the introduction of the Bedaux system of work measurement, was brought to an end as the result of an agreement, signed on 11th. February. This agreement followed a series of joint conferences presided over by the Lord Mayor of Leicester, who was accompanied by an officer of the Ministry of Labour. The agreement was in the following terms:-

(1) RESPONSIBILITY OF MANAGEMENT IN FIXING BASE RATES - The Union (The Leicester and Leicestershire Amalgamated Hosiery Union) contended that the sole responsibility for the fixing of the base rates rested with the Bedaux Company. Wolsey, Limited, gave a definite assurance that they would take full responsibility, and that ~~in~~ future, before fixing base rates, they would be prepared to consult with the Union.

(2) TESTS AND TIME STUDIES - Wolsey, Limited, gave a definite assurance that full studies of good, bad and indifferent work, and on quick, average and slow operators, would be taken; thus giving a definite undertaking that a fair average study would, in fact, be taken.

Wolsey, Limited, take full responsibility for "B. values" and are prepared to retest any "B. value" questioned by the majority of workers in any department.

It is recognised by Wolsey, Limited, that speed performance on the part of the operator shall not be sole test of efficiency.

(3) PREMIUM - Wolsey, Limited, agreed to give the direct worker 95% of the premium earned, in place of the 75% at present in operation. It was stressed, however, that in the interests of the workers it was essential that there should be team spirit, and that the indirect worker should have an inducement to give the direct operator good and efficient service. It was, therefore, agreed that the direct worker would give 5% of the premium earned, to which Wolsey, Limited, were prepared to contribute a further 5% in order to maintain the team spirit.

(4) COMPLEXITIES OF THE BEDAUX SYSTEM. Wolsey, Limited, conceded that the complexities and rigidity of the Bedaux System were amongst the chief causes of complaint, and realised that a very serious effort must be made to simplify the whole system; and, in particular Wolsey, Limited, agreed to group the various allowances in the form of an agreed value, it being understood that this value would be altered from time to time as conditions varied, by arrangement between management and the workers.

(5) Wolsey, Limited, agreed that, when it was proposed to put a new Department on Bedaux, in order that the workers in that department should have an opportunity of satisfying themselves that they could earn satisfactory wages under the system, the Company guaranteed to pay them for a period of three months their previous average hourly piece rate earnings, this figure to be agreed upon.

(6) Wolsey, Limited, also agreed to pay for work N.O.B. (work which has not been studied) at the average hourly earnings of the operator, including premium, instead of, as in the past, at the base rate, this average figure to be agreed upon.

(7) It was agreed that in a complicated department, such as the fancy department, considerable fear might exist that the application of the Bedaux System would be too complicated. Wolsey, Limited, gave a definite assurance that a simplified method of application would be installed, which would enable the girls to understand the application without any difficulty.

(8) In order that Wolsey, Limited, may be able to deal immediately with any grievances or misunderstandings which might arise in the future, they gave a definite assurance that they are prepared to establish a works council in each factory at the earliest opportunity.

(9) In order that the workers may thoroughly understand the working of the Bedaux System, Wolsey, Limited, suggest that one workers from each factory, chosen by the workers them-

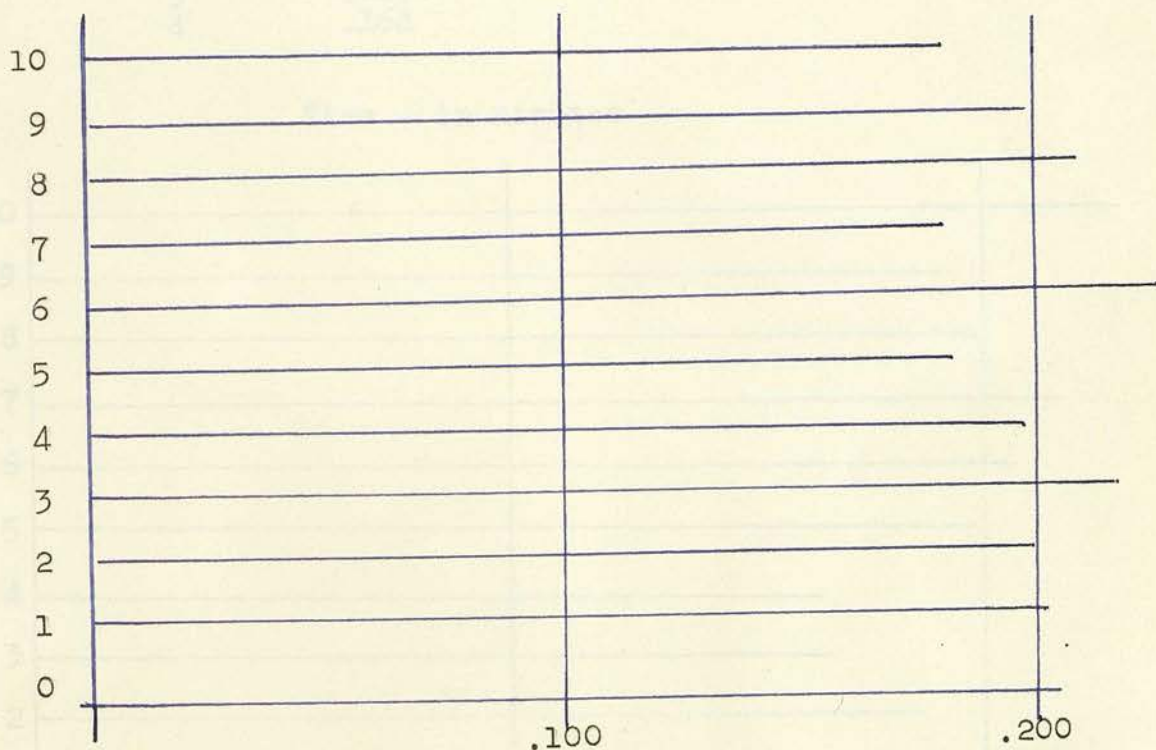
selves, shall be trained in the detailed working of the application if they so desire.

(10) The Union contended that there was considerable anxiety on the part of the work people that the Bedaux System would result in the harsh treatment of individuals. Wolsey, Limited, stated that this was directly contrary to their policy in the application of Bedaux, and they undertook to give sympathetic consideration to any case in which age or other disability is involved.

Conclusion: The signatories to this agreement are convinced that, if its provisions are carried out by all concerned in the spirit of mutual co-operation and good-will, the agreement will operate to the advantage of all parties.

Timing	Time(mins)	Chart shewing performance variation of one operator (10 timings), drilling .040" dia. hole through $\frac{1}{8}$ " thick cast iron.
6	.228	
3	.216	
8	.209	
1	.201	
2	.199	
9	.199	
4	.197	
5	.180	
7	.180	
10	.180	

Time - in minutes



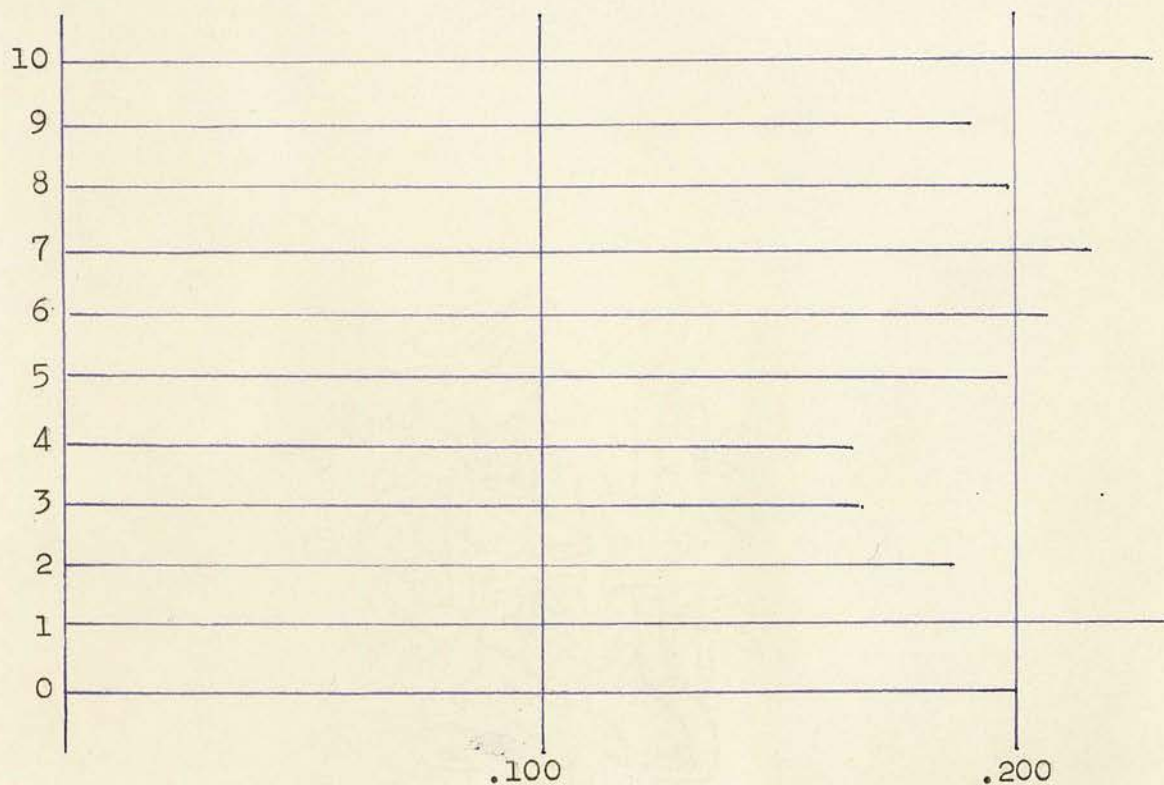
APPENDIX "D"(2)(continued)

Operator Time (mins.)

1	.233
10	.229
7	.215
6	.205
8	.199
5	.198
9	.191
2	.185
3	.165
4	.164

Chart shewing performance
variation of ten operators
drilling .040" hole through
 $\frac{1}{8}$ " thick cast iron

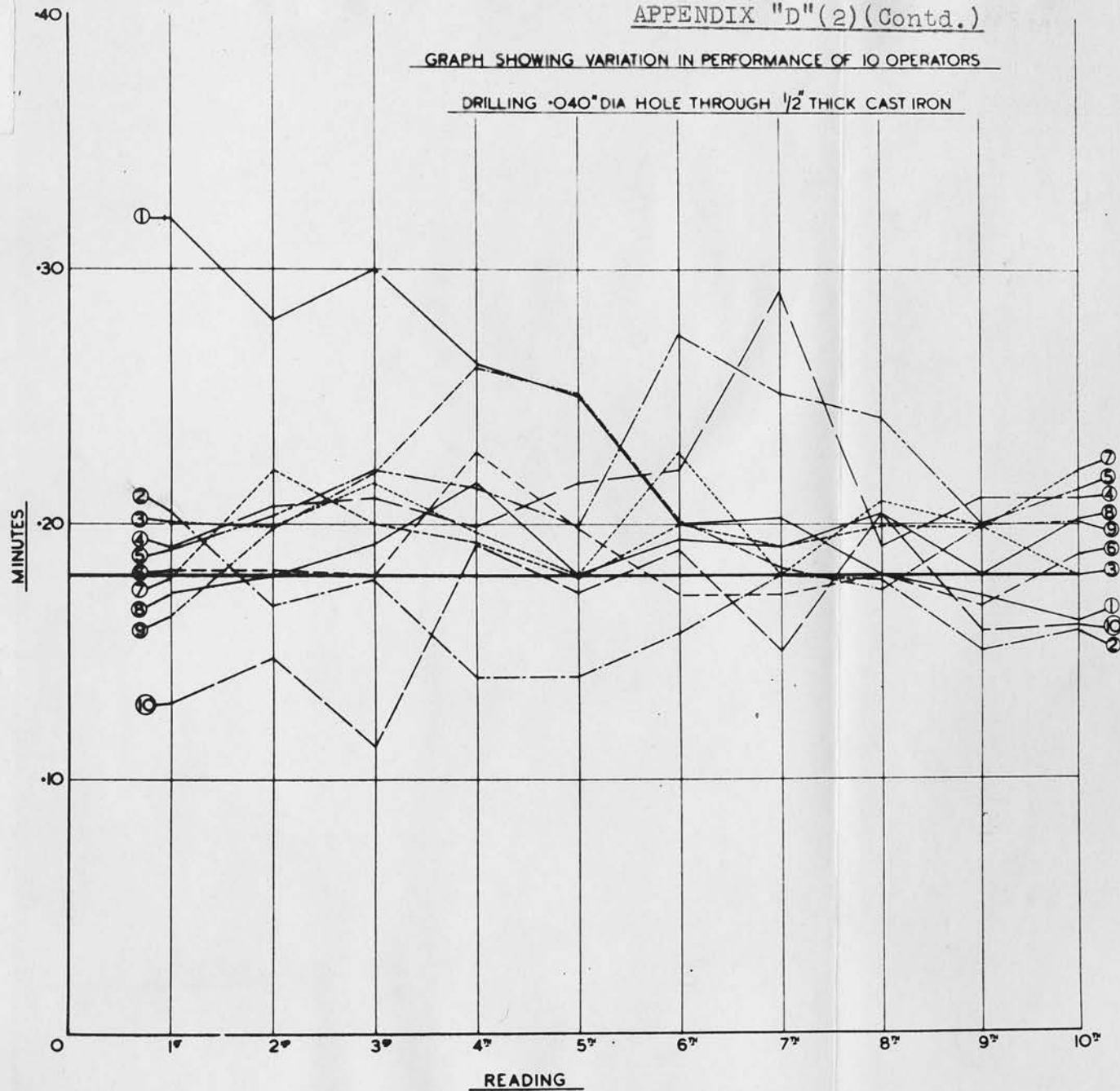
Time - in minutes



APPENDIX "D"(2)(Contd.)

GRAPH SHOWING VARIATION IN PERFORMANCE OF 10 OPERATORS

DRILLING .040" DIA HOLE THROUGH 1/2" THICK CAST IRON



APPENDIX "D" (J)

STUDY BY G.E.G DEPT. 41.
DATE 22.9.42ELEMENT RECORD CARD
No. OF OPERATORS STUDIED 10ELEMENT No. 25.A
ELEMENT VALUE .043

DESCRIPTION.

CLEAN DRILL JIG WITH AIR PISTOL.

Hold jig in left hand, pick up air pistol with right hand and clean jig thoroughly to remove swarf and oil. Place air pistol aside.

HISTORY

MACHINE	TYPE	NUMBER	R.P.M.	FEED	TOOL No.	TYPE
---------	------	--------	--------	------	----------	------

REMARKS Apply in all cases where lubricant is used on drill.

Size of jigs: Up to $2\frac{1}{2}$ " x $1\frac{1}{2}$ " x 1".

WL.94

FOR DETAILS SEE OTHER SIDE

CLOCK No.											SELECTED VALUES
171/04	.020	.040	.030	.053	.027	.047	.027	.030	.030	.027	.027
153/04	.033	.033	.033	.040	.032	.040	.040	.038	.033	.037	.033
140/04	.070	.083	.117	.117	.083	.083	.117	.077	.043	.070	.083
303/04	.040	.037	.043	.043	.043	.047	.043	.047	.043	.043	.043
294/04	.057	.043	.043	.047	.037	.053	.043	.053	.040	.040	.043
144/04	.073	.057	.023	.050	.047	.040	.043	.043	.043	.043	.043
207/04	.020	.021	.024	.020	.023	.020	.020	.020	.021	.021	.020
36/04	.022	.021	.028	.032	.040	.026	.031	.027	.023	.062	.023
317/04	.040	.048	.042	.067	.040	.058	.078	.055	.058	.058	.058
271/04	.040	.035	.022	.029	.040	.030	.040	.042	.021	.040	.040

TOTAL

ELEMENT VALUE =

.043

MINUTES

APPENDIX "E".

GROUP INCENTIVES.

CONTRACT PIECE-WORK.

Sample Contract Document as used
for Electrical Work in the Ship-
building Industry.

(copy)

AMOS & SMITH LTD.

Vessel.....Job Price No.....

.....

STATEMENT OF AGREEMENT FOR WORK TO BE CARRIED OUT ON
JOB PRICE CONTRACT.

The work detailed in the specification below will be
undertaken on job price contract for the sum of £.....

This price is based on plain time rates. The hours
actually worked on overtime are to be included in the time
on which the price is based, but all usual overtime
allowances are to be additional.

The contract price includes for all labour only
(electricians, electricians' apprentices, dilutees,
labourers, or helpers) to complete the electrical contract.

The residue of earnings after payment of the base
time wages will be shared out in the proportions of actual
hours worked per man, the payment being made to the nearest
penny.

Should the rates of pay be altered during the period
of a contract corresponding alterations will be made in
the above price.

Where contract price cannot immediately be fixed,
work must be proceeded with, and contract price arranged
as soon as details of contract or other queries are
finally settled.

The work to commence.....and to complete

All the work in this contract as regards quality and workmanship is to be carried out to the entire satisfaction of the management, and should the contract, in the opinion of the management, not be proceeding quickly enough to complete in the agreed time, they would request extra hours to be worked to complete in the time.

If owing to the non-delivery of any fittings which prevents the completion of any part of the contract, representatives of the workers and the management shall agree what proportion of the contract shall be deemed complete.

SPECIFICATION.

.....
Representative of AMOS & SMITH
LTD.
)
Representatives of EMPLOYEES
)
 Witness..... Date.....

FOR AMOS & SMITH LTD.

Signed.....

GROUP "POINTS" BONUS SYSTEM
(Explanatory Leaflet)

THE 'POOL'

The Pool is a co-operative incentive and confers on those sharing in it a definite responsibility to act in every way possible in the general interest.. The conduct of every single person participating in the Pool affects the amount to be shared by all. Every member of the Company should understand this vital point, and accept the duty and responsibility implied.

One aspect is involved in paragraph 7. below:-

(1) The pool will be operated in three sections:-

Section A.	- Cumberland Works.
Section B.	- Hendon Works.
Section C.	- Administration and Staff.

The departments participating in the respective sections are shown in the attached schedule.

(2) In making up the Pool each of the Company's products is given, by the Management, a "points" value based on its selling price. This includes repairs and service charged to customers.

(3) The Pool will be built up as follows:-

Sections A and B: From the "points" represented by the articles which reach the Finished Stores every day and which are ready for sale. These "Points" will be displayed on an indicator which will show:-

(a) The Pool "points" accumulated day by day for the current week.

- (b) The points attained over the previous week.
- (c) The percentage paid by the Pool for the previous week.

Section C: From the "points" represented by the total net sales for the month. The percentage available in the Pool for any month will be declared as soon as possible after the end of the month.

- (4) The Pool will be paid out as follows:-

Sections A and B: At the end of each week on the previous week's production.

Section C: Towards the end of each month on the sales for the previous month.

- (5) Participation in the Pool will be available to all members of the Company's permanent staff after a probationary period of one month's service. It will not be available to temporary staff.

- (6) Pool payments are subject to Income Tax which will be deducted at time of payment.

- (7) Any time lost, except on authorised holidays, will involve loss of Pool earnings. The Pool points will be spread over those who are present and working. The individual incurring such loss may be penalised. In view of the basis on which the Pool is built, and its objectives, the right is reserved to bar Pool participation for unpunctuality, slackness, or unsatisfactory conduct.

- (8) The cost of rectifying articles found defective after passing final inspection will have to be borne by Section C. of the Pool.

APPENDIX "F".

MERIT RATING.

RATING FORM FOR HOURLY-PAID EMPLOYEES.

Name:

Occupation:

Date:

CHARACTERISTICS	RATING						REMARKS
QUALITY OF WORK	Excellent	Good to Fair			Poor		25%
SPEED OF WORK	Above Average		Average		Below Average		20%
ATTENDANCE AND PUNCTUALITY.	Excellent	Good			Poor		20%
RELIABILITY	High	Fair			Poor		10%
INITIATIVE	High	Fair			Lacks		10%
CARE OF TOOLS AND MATERIALS	Very Careful	Neutral			Careless		5%
SOCIAL ATTITUDE	Pleasant	Neutral			Unco-operative		5%
SAFETY	Very Careful	Neutral			Careless		5%
TOTAL POINTS:		GRADE:					

Example: (c) Rating Scale for Shop Foreman or Head of Department.

Quality	Degrees			
Leadership and Discipline	Always obtains willing obedience: has a happy department. 100	Strict disciplinarian, but has to keep a tight hand on his staff. 75	Maintains discipline by noise and bullying, no co-operation from staff. 50	Sets bad example and commands no discipline at all. Ridiculed by staff. 25
Teaching Ability	Has a genius for teaching sub-ordinates thoroughly and quickly, using T.W.I. methods. 100	Teaches sub-ordinates well and quickly, but does not follow up to ensure thoroughness. 75	Teaching ability rather mediocre, often by rule-of-thumb. Pupils often ignorant afterwards of their job. 50	No effort to teach sub-ordinates: merely tells them to pick up the jobs from their work-mates. 25
Organisation Ability	Has all routines running smoothly. Schedules rarely missed, never through his own fault. Never flustered. Makes best use of staff and equipment. 80	Occasional failures of routines sometimes falls down on schedules, but tries hard to regain lost ground. Generally makes good use of staff and equipment. 60	Powers of organisation rather sketchy; frequently defaults on schedules. Time frequently lost due to poor organisation. 40	Shop organisation in a hopeless muddle. Rarely keeps to schedule. Much lost time due to bad allocation of labour and plant. 20
Job Knowledge	Has complete knowledge of all work in department. Can improve successfully in emergency without supervision 80	Knows most jobs in department. Can improve in emergency under supervision. 60	Rather weak knowledge of work in department. Little initiative in improvisation. 40	Very little knowledge of department's work. No initiative. 20

Quality	Degrees			
Co-operative- ness.	Unfailingly and wholeheartedly helpful and co-operative with other productive and functional depts. 20	Usually helpful and co-operative, but needs careful handling. 15	Rather suspicious and touchy, but can be won round. 10	Unmitigatedly hostile, jealous and unco-operative. 5
Housekeeping	Department always clean and well kept. Maintenance always up-to-date. 20	Department usually tidy, but sometimes needs prompting as to maintenance. 15	Often needs prompting as to the condition of his department. 10	Grossly untidy department, badly maintained. 5
Total	400	300	200	100

MERIT RATING REPORT.

Name Dept. Length of Service
 Clock No. Job. Rated by

Physical Suitability.	Excellent Physique and sound stamina. Can always provide extra effort when required.	Good Physique and stamina. Work does not overtax his strength.	Satisfactory Physique and stamina. Seldom fails to maintain standard required.	Below Physique needed for the job. Work overtaxes his strength.	Poor Physique and un-suitable for the work.
	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -
Cleanliness of person and working habits	Unusually clean in personal appearance and working habits. An example to others.	Maintains good standard of personal and working cleanliness. Above average in this respect.	Maintains fair standard of personal cleanliness and working habits. Average in this respect.	Below average in cleanliness and a messy worker. Willing to learn better habits.	Careless in appearance and a dirty worker. Has to be followed up constantly.
	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -
Willingness and enthusiasm.	Works enthusiastically. Can be trusted to do his best at all times and to try out new methods.	Can be relied upon to carry out all reasonable instructions. Improves team morale by his example.	Generally interested in the work. May slack sometimes but can usually be trusted to do acceptable job.	Does not work as well as the average. Does what he is told but has to be encouraged.	Loses interest and slacks whenever possible.
	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -
Quality of work.	Always maintains a high standard of workmanship. Very rarely makes mistakes.	Usually maintains a high standard of workmanship. Seldom makes mistakes.	Usually maintains a good standard of workmanship. Seldom makes careless mistakes.	Regularly maintains minimum acceptable standard of workmanship. Makes some careless mistakes unless supervised.	Work usually below minimum acceptable standard. Makes many mistakes.
	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -
Quantity of Work.	Outstanding. Output required always exceeded.	Very satisfactory. Output required usually exceeded.	Satisfactory. Output required sometimes exceeded.	Only just satisfactory. Output required seldom exceeded.	Unsatisfactory. Does not maintain output required.
	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -
Reliability.	Thoroughly dependable. Can always be trusted to work effectively without supervision.	Above the average. Can be relied upon to work steadily without detailed supervision.	A steady reliable worker. Needs regular but not undue supervision.	Cannot always be trusted to work steadily. Has to be supervised fairly closely.	Unreliable and un-trustworthy. Cannot be depended on to carry out instructions unless under constant supervision.
	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -	+ Accu rate -

How long have you been closely associated with this employee's work?

(approx.)

Is this person in the job best suited to him? YES / NO If not, what other type of work would he do best?

Is this person suitable for promotion? NOW / LATER / NEVER / DON'T KNOW.

Is this person (tick one) improving (): Stationary (): deteriorating ():

Is this person worth a technical training? YES / NO / DON'T KNOW.

Other comments

Signature Date

Time lost through lateness and absence (Personnel Office to complete):-

Perfect (): Excellent (): Good (): Fair (): Poor ():

DIRECTIONS FOR MAKING MERIT RATING REPORT.

Construction of the Merit Rating Report Remember:

This Merit Rating Report is divided into 7 personal qualities; each quality is divided into 5 levels of ability: each level of ability is divided (on the scale beneath it) into 3 scoring spaces. (The seventh quality, "Time lost through Lateness and Absence," has been filled in from the Personnel Office records - see above).

Method of completing the Report.

1. Start with the first personal quality on the report, i.e. Physical Suitability. Read the 5 groups of words that describe the 5 levels of ability. Then select the group of words from the five that most nearly describes the employee you are rating. If the wording describes him exactly (for this quality) then put a ✓ mark in the space above the word "accurate". If the employee is not quite as good as the description, put your ✓ mark in the space over the sign - (minus). If the man is slightly better than the description put your ✓ mark in the space over the sign + (plus).

2. One axiom of sound rating is to rate one quality at a time for all your employees.

When you have rated the first employee for this first quality, turn over to the report for the next employee and rate him for the same quality. Work through the reports, rating the first quality for all your employees; then rate them all for the second quality and so on until you have rated all your employees for all the listed qualities.

(a) Do not rate an employee on your personal like or dislike of him or his personal opinions. Your decisions must be based on the value of the employee's actions to the Company. This is the only thing that counts.

(b) Judge a man by his work during the whole time he has been under your control. DON'T judge him only on an isolated incident, whether it is good or bad.

(c) Use the same fairness and care that you want displayed when you yourself are rated.

(d) No one could ever score the maximum marks for all the highest or left-hand levels of ability. When the rating is done correctly, the majority of a "satisfactory average man's" scores fall in the third level of ability, with a few of the remaining scores (his strong points) falling in the first and second levels and a few scores (his weak points) falling in the fourth and fifth levels. The better a man is, of course, the more his scores move towards the left of the page.

(e) The rating of people is NOT a job that can be rushed through. No man, no matter what is his position likes to be judged hastily, particularly if an increase and possibly his future, rests on the result.

(f) We want men to know their faults so that they can make efforts to improve. Men will be allowed, therefore, to read their completed reports should they wish to do so, and discuss them with the personnel Manager.

PROFIT-SHARING AND CO-PARTNERSHIP.

Year	Number of undertakings practising profit-sharing (and of year)	Number of Schemes in operation (end of year)	Approximate number of employees entitled to participate	Business paid under schemes for which details are available			
				Number of Schemes	Average amount paid per head	Average percentage of profits received	Per cent.
1929	617	526	1,287,000	430	5	4	4.8
1930	638	524	1,247,000	431	10	7	5.7
1931	403	321	720,000	415	10	5	5.4
1932	491	477	1,247,000	391	9	10	5.2
1933	407	381	1,233,000	383	10	18	5.5
1934	476	340	1,154,000	343	10	13	5.7
1935	428	300	1,000,000	304	10	14	5.6
1936	403	280	900,000	280	11	6	5.1
1937	413	280	810,000	280	11	5	5.1
1938	392	274	781,000	270	11	6	5.3

APPENDIX "G".

PROFIT-SHARING AND CO-PARTNERSHIP.

* Including business under which no share was received

PROFIT-SHARING AND CO-PARTNERSHIP.

Year	Number of undertakings practising profit-sharing (end of year)	Number of Schemes in operation (end of year)	Approximate number of employees entitled to participate	Bonuses paid under schemes for which details are available+			
				Number of Schemes	Average amount per head	Average percentage addition to earnings	
					£ s d	Per cent.	
1929	517	526	267,000	420	9 9 11	4.8	
1930	508	517	247,000	428	10 2 11	5.7	
1931	492	501	240,000	415	10 6 7	5.4	
1932	471	479	227,000	391	9 10 5	5.2	
1933	453	461	223,000	383	10 18 7	5.6	
1934	435	442	224,000	369	10 12 3	5.7	
1935	428	434	235,000	356	10 14 5	5.8	
1936	422	428	261,000	368	11 6 1	6.1	
1937	413	419	265,000	369	11 8 0	6.1	
1938	399	404	261,000	355	11 6 7	5.9	

+ Including schemes under which no bonus was earned

=In some of these schemes employees may receive part or the whole of their subsequent bonuses in cash, etc. after a prescribed period, or after they have accumulated a prescribed amount of capital.

Types of Schemes.

The following Table gives particulars for schemes of various types at the end of 1938:-

Type of scheme+	Schemes in operation at end of 1938			Number of Schemes discontinued by end of 1938
	Number of Schemes	Total Number of employees	Approximate number of employees entitled to participate	
"Share issue" schemes, i.e. schemes consisting in the issue to employees of share capital, either free, or on specially favourable terms.	45	122,100	22,900	48
"Deposit" schemes, i.e. schemes under which interest, varying with the profits, is allowed on deposits made by employees	17	30,000	5,800	20
Other schemes, [±] analysed by methods of paying bonus:				
(a) Bonus paid in shares or invested in capital of the undertaking. =	29	35,000	27,400	22
(b) Bonus retained in a provident, superannuation, or other similar fund.	11	4,600	3,900	19
(c) Bonus paid in cash, or credited to a savings or deposit account.	94	120,000	97,500	249
(d) Bonus paid in other ways; combinations of above systems; or method of payment unknown.	65	74,000	51,700	53
Total	261	385,700	219,200	411

+Where a scheme has been modified since its introduction, it has been classified according to its latest form.

*For the majority of schemes in this group the bonus is a definite proportion of profits or a sum determined by the rate of dividend paid to shareholders.

PAYMENT-BY-RESULTS AND INDIRECT LABOUR.

There are inevitably certain types of workers who cannot be remunerated on a payment-by-results basis because their results are not easily measurable. Such employees as maintenance staff, stores issuers, labourers, transport men, and so on constitute this category, and yet they contribute in varying degrees to the output of the whole plant. If such workers are paid by results and others are not, dissatisfaction may well result, and, if possible, auxiliary workers should have some share in the bonus paid to direct workers otherwise an increase in the output of the latter necessitates a corresponding increase in effort put out by the indirect workers. The latter condition is not fulfilled unless the bonus is distributed for increasing the remuneration of the auxiliary workers.

APPENDIX "H".

PAYMENT-BY-RESULTS AND

INDIRECT LABOUR.

Auxiliary workers may be divided into two classes, viz. (a) those workers who are remunerated on a bonus basis and (b) those who are not. The former class includes the stores issuers, transport men, and so on, who are remunerated on a bonus basis. The latter class includes the maintenance staff, labourers, and so on, who are not remunerated on a bonus basis. The bonus paid to the former class is calculated on the basis of the output of the whole plant, and the latter class is remunerated on a fixed basis. The bonus paid to the former class is calculated on the basis of the output of the whole plant, and the latter class is remunerated on a fixed basis.

Where the indirect workers are remunerated on a bonus basis, and not otherwise, the output of a particular group of productive workers, their total bonus may be calculated as

PAYMENT-BY-RESULTS AND INDIRECT LABOUR.

There are inevitably certain types of workers who cannot be remunerated on a payment-by-results basis because their results are not easily measurable. Such employees as maintenance staff, stores issuers, labourers, transport men, and so on come within this category, and yet they contribute in varying degrees to the output of the whole plant. If some workers are paid by results and others are not, dissatisfaction may well result, and, if possible, ancillary workers should have some share in the bonuses paid to direct workers wherever an increase in the output of the latter necessitates a proportionate increase in effort put out by the indirect workers. If this latter condition is not fulfilled there is no justification for increasing the remuneration of the ancillary workers.

Ancillary workers may be divided into two classes, viz. (a) those workers such as furnace-men and labourers, who work directly with a certain group of productive workers, and can influence the latter's output; and (b) those who have no such direct association, but serve the plant as a whole. The first group should receive a bonus based on the earnings of the direct workers whom they serve, and the latter a bonus based either on the average piece-work earnings of the works as a whole, or on the total output of the plant.

Where the indirect workers work in close association with, and can influence the output of, a certain group of productive workers, their total bonus may be calculated on

the piece-earnings of the direct workers, divided by the number of hours worked by the indirect workers. This must be multiplied by an arbitrary figure (P) which is calculated to yield a reasonable bonus to the ancillary workers, thus:-

$$\frac{P \times \text{piece-earnings of direct workers}}{\text{Total hours worked by indirect workers}} = \text{Amount of bonus payable per hour to ancillary workers.}$$

It follows from such an arrangement that if the ancillary workers can do their job with either fewer men or in a shorter time, the amount of bonus received per hour worked will rise. Hence there is an incentive to speedy working and efficiency on the part of the indirect workers. Not only so, but the ancillary workers have an incentive to increase, so far as it lies within their power, the efficiency of the productive workers, for this will result in a higher bonus payment for both classes of workers.

On the other hand, the amount of bonus paid to the indirect workers is not in direct proportion to the amount of effort which they put forth, since the total bonus pool depends upon the output of the direct workers. Further, the scheme suffers from the inevitable disadvantage of a collective incentive, namely that there may be a tendency for certain workers to slack and yet still enjoy the same bonus as their more energetic fellows.

Bonuses for executives and supervisors are outside the scope of this thesis; this subject merits a detailed study of its own. It may be said here, however, that as a

general rule it would seem to be undesirable to pay supervisors bonuses based on the output of their subordinates, since this policy inevitably tends to mitigate against good relations between the foreman and his shop. There is a grave danger of the foreman becoming an ogre constantly driving his men to greater efforts, an attitude which is calculated to destroy all spirit of co-operation and goodwill. The financial incentive of this type of arrangement is much too direct, and it would seem to be more satisfactory to encourage supervisory efficiency by means of non-financial incentives only.

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